

# amateur radio

MAY, 1974



- A LINEAR AMPLIFIER
- A SIX METRE TRANSVERTER
- A  $\frac{1}{4}$  WAVELENGTH MOBILE ANTENNA
- MULTI-CHANNEL SWITCHING FOR THE VINTEN MTR13
- WIA SUBMISSION TO INDEPENDENT ENQUIRY INTO FM BROADCASTING
- 1973 RED CROSS MURRAY RIVER MARATHON



JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

# GRID DIP METER SPECIFICATION



**Model TE-15**  
Freq. Range: 440kHz-280MHz  
in 6 Coils  
A Coil 0.4-1.3MHz  
B Coil 1.3-4.3MHz  
C Coil 4.4MHz  
D Coil 14.4MHz  
F Coil 120-280MHz  
Transistor: 3 TR's & 1 Diode  
Meter: 500uA F.s.  
Battery: 9V (600P)  
Dimensions: 180x50x40mm  
Weight: 730g

**Price \$38.50**

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**Model HE-220**  
**Model TE-220**  
Freq. Range: Sin: 20Hz-200kHz  
Square: 20Hz-25kHz  
Output Voltage: Sine: 7 volt.  
Square: 7 volt.  
Output Impedance: 1000 ohm  
Freq. Accuracy: -3% + 2%  
Distortion: Less than 2%  
Tube Complement: 6BM8  
12 AT7, 6Z4  
Power Source: 105-125, 220-240V AC, 50/60 cps. 18W  
With Attenuation Range  
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**GENERAL COVERAGE**  
5 BANDS 150-400 kHz, 500-1500 kHz (Broadcast band), 1.6-4.6 MHz, 4.6-14.6 MHz, 10.5-30 MHz. Operates from 12 Volts DC (negative ground) or 220-240 Volts 50 Hz.  
• Field Effect Transistors in RF Mixer and Oscillator Stages.  
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6SK7-ECH35-6K8G-5763	\$3.00
6SJ7GT-12AT7	\$1.50
Coil Formers 1 1/2" diameter	
Octal base	40c

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# amateur radio

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Copy is required by the third of each month. Acknowledgment may not be made unless specially requested. All important items should be sent by certified mail. The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying any reason.

### Advertising:

Advertising material should be sent direct to P.O. Box 150, Toorak, Vic., 3142, by the 25th of the second month preceding publication. Phone: 24-8652.

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### FRONT COVER

The new Headquarters for the Victorian Division, situated at 412 Brunswick Street, Fitzroy. The Division paid \$68,000 for the building and intends spending about \$10,000 on library, workshop and lecture theatre facilities.

### DIVISIONAL BROADCASTS

#### VK4W1

09.00 local time Sundays:

3590 kHz AM

7140 kHz SSB

re-broadcast on Ch B FM. BC officer VK4HB.

#### VK5W1

23.30Z Sunday mornings originating on 1.8

MHz band and relayed as follows—

3.815 MHz by VK5ZQ

7.125 MHz by VK5MB

14.170 MHz by VK6TY

52.2 MHz by VK5ZEG

Ch 48 by VK5WB

VK3CM in Darwin on 2m

VK5DK in Mt. Gambier on 2m

#### VK6W1

09.30 local time on Sundays:

3600 kHz SSB

7080 kHz SSB

14100 kHz SSB

52.555 MHz FM

#### VK7

09.30 local time on Sundays originated on

Mt. Barrow 2m repeater: VK7RAA and re-

broadcast in Launceston area 3072 kHz SSB,

7130 kHz AM and in Hobart area on 53.032

AM, 144.1 MHz AM, 140 MHz FM and 432.1

MHz AM.

Do you have the time and want to keep in touch with events? If so here are the latest details available of Divisional broadcasts.

#### VK1W1

First broadcast scheduled for Sunday 21st

April and thereafter same day and time:

10.00Z 3595 kHz

7140 kHz

14E2 MHz FM

BC Committee VK1VP, IMP, ZYS/1.

#### VK3AW1

11.00 local

3595 kHz AM

7140 kHz SSB

52.525 MHz FM

53.665 MHz AM

145.13 MHz AM

Hunter Branch Mondays 18.00h 80m.

#### VK3W1

10.30 local time Sundays:

1805 kHz AM

3600 kHz SSB

7140 kHz SSB

Ch1 FM

(subject to availability at present of relay stations whilst under re-location).

**50MHz****HIGH STABILITY VFO PLUS!  
PHASE LOCKED SYNTHESIZER!!****TRANSCEIVER****VHF SSB 10W****IC-501****FEATURES:**

- 50-54MHz
- SSB, AM, CW
- 10 WATTS P.E.P.
- USB, LSB, AM, CW
- XTAL FILTERS FOR AM AND CW
- VFO OPERATION WITH XTAL STABILITY USING PLL TECHNIQUE
- RECEIVER SENSITIVITY  
A3, 0dbu (S+N) / N 10db  
A3J, A1, -6dbu (S+N) / N 10db  
NOTE: 0db = 1µV
- 4 XTAL CHANNELS AVAILABLE
- SIZE 111 x 230 x 260 mm, 5.1 kg WEIGHT

**COMING SOON! IC201 2m SSB TRANSCEIVER!****PRICE \$395****Plug-in Power Supply AC  
EXTRA \$36****ALL PRICES INCLUDE FREIGHT  
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see advt. this issue.**MAICO ELECTRONICS  
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6357/P 7½" L x 4½" W x 3" D

7134/P 4½" L x 2½" W x 1" D

6827/P 7½" L x 4" W x 2" D

7970/P 7½" L x 7½" W x 2½" D

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**ECONOMICAL SSB!**

## FT-200 FIVE-BAND TRANSCEIVER

from YAESU

### GENERAL DESCRIPTION

A superb quality, low cost, versatile transceiver. Covers 80-10 mc, tuning range 500 Kc. each band. On 10 mc, crystal supplied for 28.5-29 Mc. (Crystals available optional extra for full 10 mc coverage.) SSB, CW, AM; with a speech peak input of 300w. Transistorised VFO, voltage regulator, and calibrator, 16 valves, 12 diodes, 6 transistors, PA two 6J55A pentodes. ALC, AGC, ANL, PTT and VOX. Calibrated metering for PA cathode current, relative power output, and receiver S units. Offset tuning  $\pm 5$  Kc. Uses a 9 Mc. crystal filter with bandwidth of 2.3 Kc. at  $-8$  db. Selectable sidebands.

Provision for use of optional external VFO, FV-200 VFO includes fixed channel facility.

Operates from conservatively rated separate 230 volt 50 c.p.s. AC power supply, FP-200, which includes built-in speaker. Transceiver incorporates power take-off and low level R.F. drive outlets suitable for transverters.

Cabinet finished in communication grey lacquer. Panel, etched, satin finish aluminium.

### TECHNICAL DATA

(OPTION)

#### MODE OF OPERATION

SSB(A3J), PHONE(A3H), CW.

#### FREQUENCY RANGE:

3.5-4.0, 7.0-7.5, 14.0-14.5,  
21.0-21.5, (28.0-28.5),  
28.5-29.0, (29.0-29.5),  
(29.5-30.0 MHz)

#### FREQUENCY STABILITY:

AFTER WARM-UP, 100 CPS/30 MIN.

#### SPURIOUS RESPONSE:

BETTER THAN  $-40$  db

#### ANTENNA IMPEDANCE:

50-100 $\Omega$  UNBALANCED

#### CARRIER SUPPRESSION:

BETTER THAN  $-40$  db

#### SIDE BAND SUPPRESSION:

$-50$  db AT 1000 CPS

#### 3 RD HARMONIC INTERMODULATION DISTORTION:

$-30$  db (P.E.P.)

#### TRANSMISSION BANDWIDTH:

3 KHz

#### RECEIVE SENSITIVITY:

0.5  $\mu$ V S/N 10 db

#### FILTER SELECTIVITY:

2.3 KHz ( $-6$  db) 4 KHz ( $-60$  db,

#### IF MIXING BEATS:

50 db DOWN

#### IMAGE INTERFERENCE:

50 db DOWN

#### AGC CHARACTERISTIC:

AMPLIFIED AGC

#### RECEIVER OUTPUT POWER:

1 W (AT 10% DISTORTION)

#### WEIGHT:

17.6 LBS

#### DIMENSIONS:

13  $\frac{1}{2}$ " wide, 5  $\frac{1}{2}$ " high, 11" deep.

#### Price including Sales Tax, excluding freight

FT-200 - \$331.00	Prices and
FY-200 - \$115.00	specifications
FP-200 - \$90.00	subject to change



**ELECTRONIC  
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60 Shannon St. Box Hill North, Vic., 3129.  
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N.S.W.: STEPHEN KUHLE P.O. Box 56, Mascot, 2020

Ph. 57 6830  
Ph. Day 667 1650

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#### TECHNICAL INFORMATION

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**Lubricant:** Lubricates even the most delicate mechanisms; non-gummy, non-sticky; does not pick up dust or dirt.

**Penetrant:** Penetrates to loosen frozen parts in seconds.

**Volume Resistivity per ASTM D-257:** Room temperature, ohm/cm.;  $1.04 \times 10^{12}$ .

**Dielectric Constant per ASTM-877:**

Dielectric Constant 2.11, Dissipation Factor: 0.02.

**Dielectric Strength per ASTM D-150:**

Breakdown Voltage 0.1 inch gap, 32,000 volts.

Dielectric Strength volts/inch, 320,000 volts.

**Flash Point (Dried Film),** 900 degrees F.

**Fire Point (Dried Film),** 900 degrees F.

**TESTS AND RESULTS:** 950 degrees F.

**Lawrence Hydrogen Embrittlement Test for Safety on High Tensile Strength Steels:** Passed. Certified safe within limits of Douglas Service Bulletin 13-1 and Boeing D6 17487.

**Mil. Spec. C-16173 D-Grade 3,** Passed.

**Mil. Spec. C-23411,** Passed.

**Swiss Federal Government Testing Authority for Industry:** Passed 7-Day Rust Test for acid and salt water. Passed Weiland Machine Test for Lubricity as being superior to mineral oil plus additives.

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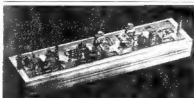
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**200MHz Counter Kit** (EA Dec 73). Fully solid state with latest MSI, ICs and LED Readout. Uses 29 ICs so it's straightforward to build and very economical. Our kit is in two parts—basic counter, 4½ decades to 20MHz, complete kit (Yes crystal included) for only **\$99.00** Prescaler to 200MHz only

**\$26**. So you can build a complete 200MHz counter for only **\$125.00**. (All P & P 50c).

**Digital Voltmeter** (EA Oct 73) with 3½ digit read-out and 0.5% plus or minus 1 digit accuracy. Uses the Analog Devices LED panelmeter. Complete kit covers 200mV to 2kV and 20 ohm to 20M, for just **\$145.00**. Panelmeter alone **\$102.00** (Data in our catalogue) P & P 50c.

### KITS



The ever popular 2 Metre kit as built by Jim Rowe in Electronics Australia Jan '74. "Confidently recommended" — Quote! Don't fiddle around, fork out \$37.50 for the full kit (less metalwork) and save \$5 on the 3 stages. (P & P 50 cents)

### NEW, NEW, NEW 8 METRE AMP

Following Jim's article and his suggestions we have produced a 8 Metre version. In future all kits will have instructions for both 2 and 8 Metre circuits. Since the gain is higher at lower frequencies, the 8 Metre job only takes two stages the one using a 2N5950 is not needed and the drive is only 100mW (an MPF121 amplifier is excellent). Cost of the 8 Metre kit is only **\$29.50**. (P & P 50 cents)

### BOOKS

We must have the best selection of books for the electronics/amateur radio enthusiasts. We import some from overseas ourselves, having checked their suitability. New titles just in include: **Radio Amateur Callbook** (USA) gives an alphabetical directory listing by call letters of names

and addresses and class of licence for every radio amateur in the States, Possessions and personnel overseas. Over 283,000 K and W calls are listed. A must for every serious Ham and SWLs. Yes, over a quarter of a million calls listed. New edition just published has over 600 pages, **\$9.95**. (P & P \$1.00)

**Foreign Radio Amateur Callbook** (DX Listings) covers over 211,000 radio amateurs outside the USA. Companion volume to above. Latest edition runs to over 600 pages, **\$9.95**. (P & P \$1.00)

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2-08	3/4	8	3	No. 3006	88c
2-16	3/4	16	3	No. 3007	88c
3-08	1	8	3	No. 3010	\$1.06
3-16	1	16	3	No. 3011	\$1.06
4-08	1	8	3	No. 3014	\$1.19
4-16	1	16	3	No. 3015	\$1.19
5-08	1 1/4	8	4	No. 3018	\$1.32
5-16	1 1/4	16	4	No. 3019	\$1.32
8-10	2	10	4	No. 3907	\$1.91

Special Antenna All-Band Tuner Inductance

(equivalent to B & W No. 3907 7 inch), 7" length, 2" diam., 10 turns/inch.

Price **\$3.30**

References: A.R.R.L. Handbook 1961: QST, March, 1959 Amateur Radio, Dec. 1959 Write for range of Transmission Coils

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## FEDERAL CONVENTION

The 38th Federal Convention held in Sydney during the Easter holidays is now a talking point.

Every Convention earns a nickname. This one was the Procedural Convention.

A brand new Division was admitted into the WIA — the WIA ACT Division Inc. The VK1 Division is now a reality. This event did generate considerable constitutional discussions.

However, this Convention also decided that surprises should be the order of the day.

The Victorian Division withdrew en bloc on a procedural tangle. The Secretary resigned and walked out.

Both returned thanks to good sense and diplomatic moves.

Without a VK3 Division the Institute would certainly appear peculiar to the least. If the Secretary goes, get another.

Traumatic? But doesn't this indicate our slip shows on so many occasions? The NSW Division voting last September becoming a damp squib thanks to the good sense of members was another example. But can the Institute withstand too many doses of brinkmanship? The view of Lake Burley Griffin from 10 000m whilst flying back from Sydney somehow highlighted the intense commercialism surrounding us and the intrusion of politics into our lives.

Is it necessary for any of us in amateur radio to ape the antics of politicians or the power games of commerce?

An observer at the Convention could well have thought this even though the intent was not there.

The Convention was essential — make no mistake about this. Where in it all can be found the help that each member hopes to be at hand when needed. Probably in better understanding, better administration, better appreciation of common problems.

Amateur radio as such did not receive attention in great depth because other matters pre-occupied the time available. Finances, budgets and inflation however were closely examined.

The element necessary to cover the costs of AR, IARU representation and the continuance of the central Executive office in 1975 was raised by \$2.60 with the greatest reluctance from the present \$7.20 p.a. All Councillors fully understood the implications which will reflect upon the annual subscriptions payable. But the facts of life cannot be swept under the carpet.

Whatever the outcome, the WIA is here to serve the members. The Executive will continue to serve the members of the Institute, Australia-wide, to the best of the ability of each amateur elected to the Executive. Amateur radio is a wonderful leisure activity — it deserves the very best effort by everyone.

D. A. Wardlaw Federal President

## VICTORIAN DIVISION

Correspondence received by the Executive Office will show that many members do not distinguish between the WIA (i.e. Executive) and the WIA Victorian Division. Mail arrives at one office but in reality refers to matters within the others' jurisdiction. The offices are several miles apart. In the absence of any regular courier service between the two no incorrectly addressed mail must therefore be re-directed. This causes delays apart from involving the Institute in extra costs in postage and time. The following are the main items dealt with by the Executive Office —

- Amateur Radio
- Call Book (except incorrect listings)
- Magnums
- WIA Subscriptions processing (but not changes in amounts and not new members)
- WIA EDP membership records, changes of address and the files.

Please do not include Victorian Division matters in letters (etc.) referring to Executive matters.

## EXECUTIVE OFFICE

Because of the operation of 'flexhours' and staffing difficulties the Executives' Office in Toorak will not normally be manned before about 10.30 a.m. on working days. If any member has any occasion to telephone the office it would be best if this could be done in the afternoons. Members in Victoria are specially requested to ensure that calls to the office should be confined to matters dealing with Executive affairs (such as Amateur Radio, Magnums, etc.). Matters of a Divisional nature (such as components, membership, classes, meetings, etc.) should of course be referred to the Victorian Division.

## BREAK-IN

From 1st July 1974 the annual subscription to NZART's journal 'Break-In' will be \$4.20 when purchased through Magnums. Subscribers to this service who pay or have paid before 1st July will naturally continue at the old rate.

## NEW PREFIXES

Radio Communications, Feb. '74, quotes ITU as having allocated the following call sign series —  
PQA-PZP Papua New Guinea.  
SEA-SEZ Rep. of Singapore.

## DELAYS TO CORRESPONDENCE

The Executive office has been severely inundated with subscriptions processing and other pressing matters since mid-November. For periods there was also an absence of typing and clerical assistance. During March the office was heavily engaged in dealing with pre-convention material. Consequently there have been some delays in answering correspondence and any member so affected is requested to be as patient as possible although in most instances any requested action was done on receipt of the letter concerned.

## POLLUTION

"The electromagnetic garbage which 'levitated' our 20-metre band during the summer and early fall (complex signals every 4 kHz) was finally cleared up after an unprecedented amount of diplomatic and administrative pressure had been brought to bear by the United States and Canada. Most of what was heard in North America originated in Cuba, but our friends in Europe had similar interference coming from at least one station in the USSR. The amount of time and energy devoted to this problem by the Wand VE administrations was indeed gratifying." QST, Jan. '74.

## SSB WIDROADCASTING

Pat Hawker (G5VA) writes in Radio Communications for Feb. '73 in his Technical Topics Column, "From time to time we have returned to the work going on in various parts of Europe in an effort to develop domestic receivers which would be suitable for either SSB or AM broadcasting. Most of these systems use synchronous (product) detection either by the use of phase-locked loops or the reconstitution of a phase-coherent carrier from the incoming signal. While I feel that widespread use of SSB broadcasting is still some way away, there is no doubt that some very interesting techniques are emerging from this work. One of his (G5VA) contributions represents an independent development of the half-and-half type of oscillator stabilisation as a means of overcoming the problem of expecting broadcast listeners to tune to SSB signals (for music this needs to be an accuracy of about 2 to 5 Hz compared with the 50 Hz which is about adequate for speech communication)."

## ITU CONVENTION

The IARU Region 1 News for Dec. '73 reports as under on the recent ITU Conference.

"The Plenipotentiary Conference of the International Telecommunication Union met for six weeks (from 14 September to 23 October) at Malaga-Torremolinos (Spain) and ended with the signing of the new International Telecommunication Convention by the representatives of 132 ITU Member countries.

The Conference, which is the supreme organ of the Union, was convened to consider and revise the Union's basic document, the Convention, drawn up by the previous Plenipotentiary Conference held in Montreux, Switzerland, in 1965, and to decide whether the new document should take the form of a convention, as hitherto, or that of a Constitutional Charter.

The Conference, attended by 655 delegates from 132 countries, finally decided to retain the Convention form, dividing it into two parts: the Basic Provisions containing articles of a permanent nature; and the General Regulations, containing the rules governing the functioning of the various organs of the Union.

The Convention will come into force on 1st January, 1975."

## STOP PRESS

**Customs Department Canberra advise Amateur Transceivers up to and including 29.7 MHz are included in Consolidated By-Laws from 1st April 1974, as duty-free in their own right. Ref.: CG72/78684.**

## EXECUTIVE MEMBERS 1974

The Convention elected the following: Dr. D. A. Wardlaw VK3ADZ, Surg.-Capt. B. J. Uyd VK3CDR, Messrs. J. J. Martin VK3TY, D. H. V. Rankin VK3QV, K. V. Rogert VK3QY and A. P. Wolfenden VK3ZPA. The Secretary, P. B. Dodd VK3CIF, continues in office.



# 1973 Murray River Red Cross Marathon

Roly Roper

C/o PO Box 150, Toorak, 3142

On Wednesday 26th December 1973, the WIA commenced its second involvement with the Red Cross in the staging of the Murray River Marathon.

Over thirty operators with more than ten vehicles slogged it out for five days, working their way from Yarrowonga to Swan Hill along the river.

This WICEN exercise is probably the toughest and most realistic yet devised with real traffic (concerning the safety of real people) being passed continuously through the long days. The toll on people and equipment was heavy — but the amateur spirit was abundant; whatever went wrong was fixed and whoever was ill was nursed back to health by the kind efforts of the Red Cross First Aiders.

Each day a complex net was set up on 80m SSB and 2FM (1 and/or B) consisting of net control, five or six riverside stations at checkpoints, up to seven boats on the river, a relay group, two medical evacuation vehicles (Medivacs) and a forward reconnaissance party. 10M SSB was used for a few hours to find its effectiveness in the flat terrain.



The willing assistance of the Land Rover Owners Club (LROC) was essential as the area (particularly the Bermah Forest) had been recently flooded leaving many tracks impassable and the heavy rain on day 4 only made the situation worse.

On more than one occasion LROC members rescued WICEN teams whose enthusiasm and dedication caused them to take on tracks that were better left to four wheel drive vehicles.

"Botalism" (Morrie VK3BMD) showed an admirable sense of 'esprit de corps' by putting on his WIA tee-shirt on Boxing day and refusing to remove it until New Years Day.

After Bob VK3BMA came down with a stomach wog, most operators opted for tinned supplies rather than drink the water and a new Q code was coined "QBB" (which is perhaps better left undefined here).

Those present included:

VK3s AVJ, ZRG, BMD, ZZU, TX, YQ, BGY (and wife), AUI, ROLY ROPER, ZKO, ZCO, ZAZ, YGK, ZLP, YGY, ZSQ, ZCX, ZMM, (CAPT)OR, YJM (YJ What his name?) SS, ZJS, YCQ, AUR, YHJ, JOHN COX, VK, YBM, YJE, NEIL MATCHEN, AYL and "locale" Z2EO (who dropped down from Deniliquin) REX 3VL, **Seeker** GEORGE 3AGM and wife, BRUCE 3BM and visitors BAF and WW, all of whose assistance both on and off air was greatly appreciated.



ROBERT VK3AVJ with his mobile rig, complete with "heat sink".

On the lighter side, the group sponsored one of the First Aiders, Barbara Taczanowski in the Queen of the Marathon Quest and she repaid our confidence in her by winning.

The exercise was organised by RAY VK3ZRG and KEITH VK3YQ, who were assisted by "Capt" John VK3OR.

LEFT: Barbara Taczanowski, of the Queen of the Marathon Contest.



MARTIN VK3YJM (YJ what's his name?) with Ken hand-held unit.

Operating in recently flooded country took on a new dimension with the Queensland floods and any person who thinks WICEN is not needed need only glance at the latest copy of APO News, "... an estimated 35,000 telephone services in the state were out of order at one time as a result of flooding, ..." and at Ipswich exchange, "... traffic levels were running as high as three times more than the system could handle."

Anybody interested in joining in WICEN activities should contact Keith VK3YQ, Ray VK3ZRG, or drop a note to PO Box 63, Kew 3101.



RIGHT: Keith VK3YQ, Dean (Key Section) VK3TX brass pounding in the van of Robert VK3AVJ, and VK3ZCX.

# experiments in modulation and audio

## part three

J. A. Adcock, VK3ACA  
P.O. Box 106, Preston, 3072

This month the third part of this series is presented. It describes the rarely used fourth method of generating SSB.

### GENERATING OF SSBSC BY THE FOURTH METHOD, System 4

This method and variants of it have been called the fourth method. There is already a third method. This method is a development of the method of generating DSBSC described in system 1. It consists of first generating the frequency component of the SSB signal and then impressing the amplitude component of the signal on it. This is done in a class "C" final.

For a single side band signal let  $A \sin \Theta_1$  be the audio wave form where  $A$  is the amplitude component and  $\Theta_1 = 2\pi f_1 t$ . Let  $B \sin \Theta_2$  be the RF wave form where  $B$  is the RF amplitude and  $\Theta_2 = 2\pi f_2 t$ .  $A$  and  $f_1$  are variable whereas  $B$  and  $f_2$  are fixed for a particular case.

The general expression for SSB from the phasing method is given by:

$$A \sin \Theta_1, B \sin \Theta_2 + A \cos \Theta_1, B \cos \Theta_2 \quad (5)$$

From the identity:

$$a \cos \Theta + b \sin \Theta = \sqrt{a^2 + b^2} \cos (\Theta + \alpha) \quad (6)$$

we get:

$$AB[\sin^2 \Theta_1 + \cos^2 \Theta_1] \cos (\Theta_2 + \Theta_1) \quad (6)$$

The left hand side of the product is only audio and represents the envelope of the wave. The right hand side is only RF and by itself represents the frequency component of the side-band, with the amplitude removed. On the left hand side,  $B$  is a constant and can be removed, so we have envelope:

$$= \frac{A \sqrt{\sin^2 \Theta_1 + \cos^2 \Theta_1}}{\sqrt{A^2 \sin^2 \Theta_1 + A^2 \cos^2 \Theta_1}}$$

which is the expression for the amplitude curve given in equation (4). If the expression for an SSB signal, equation (6) is divided by the envelope wave form, equation (4), we are left with RF with no amplitude variation. Similarly if the audio wave form is divided by the envelope wave form we get audio without amplitude variation — thus  $\frac{A \sin \Theta_1}{A} = \sin \Theta_1$ .

This is the basis of system 5 to be described briefly later in part 4 of the series.

Using the equations  $\frac{A \sin \Theta_1}{A} = \sin \Theta_1$

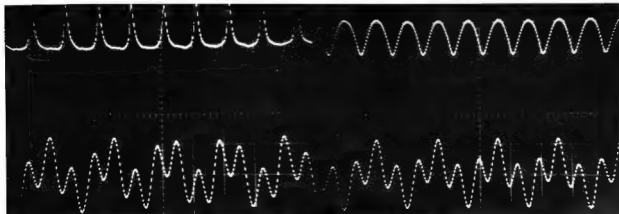
and  $\frac{A \cos \Theta_1}{A} = \cos \Theta_1$  in the phasing

system, sideband can be produced without amplitude variation. That is by substituting the above into equation (6) we get  $\cos (\Theta_2 + \Theta_1)$  only. Since this signal is without amplitude variation, it can be generated in an early stage of the transmitter and amplified by class C stages. The amplitude (or envelope) wave form "A" derived from equation (4) can be used to high level modulate a class C final to produce the original side band signal of equation (6). Such a system is shown as a block diagram in fig. 9.

The system above has never been tried in that form. As described it is a complicated and difficult method of putting side band together. The chief disadvantage is that it would require a direct coupled series modulator for the amplitude component.

Can the above system be simplified? In the first place, since a fully clipped side band is most desirable, why put the amplitude on the signal at all?

(There is no evidence to support the desirability of a fully clipped sideband signal. Anyone who has attempted to use much more than 20dB of clipping, will realise that increases in average power are accompanied by increases in distortion. Eventually, although the signal is a little



PHOTOGRAPH 3.—ENVELOPE WAVEFORMS  
Horizontal Scale, 1 division 1 ms. Upper Trace, Two tone audio input. Lower Trace, Envelope waveform produced by computer. This waveform corresponds to that defined in equation 4.

PHOTOGRAPH 4.—FREQUENCY DEVIATION WAVEFORMS  
Horizontal Scale, 1 division 1 ms. Upper Trace, Two tone audio input. Lower Trace, Voltage proportion to frequency deviation as defined in equation 7.

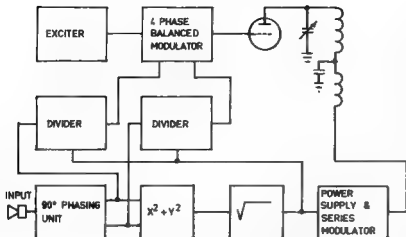


FIG 9 SSB MODULATOR FIRST VERSION DESCRIBED

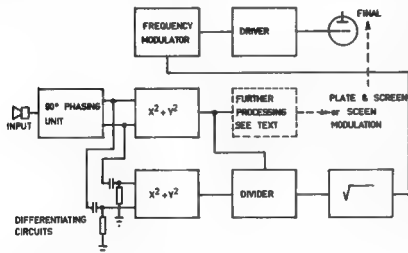


FIG 10 IMPROVED SSB GENERATOR

stronger, it is unintelligible. — Technical Editor)

In the second place it is possible to derive the amplitude curve and impress it on the signal containing the frequency components. It is also possible to derive the frequency deviation curve and frequency modulate the oscillator with it.

The equation to produce the frequency deviation curve is shown thus

$$\text{Frequency deviation} = \frac{d(A \sin \Theta)}{dt} + \frac{d(A \cos \Theta)}{dt} \quad (7)$$

$$\sqrt{(A \sin \Theta)^2 + (A \cos \Theta)^2}$$

At present no explanations or derivations are offered for this equation. A block diagram of the system is shown in fig. 10.

If a sine wave of varying frequency and amplitude is fed into the system of fig. 10, a DC voltage will appear at the output of the computer with value independent of amplitude, but proportional to frequency. If this signal is fed into a frequency modulator, it comes out as single sideband. (Without the amplitude variations of course. These must be added later. — Technical Editor.)

The amount of deviation used must match the frequency excursions in the original audio. Also, like most of the circuits described so far, the system must be DC coupled from the  $x^2 + y^2$  units to the frequency modulator. Note that the output from equation (7) will have one sign only, that is, it is a varying DC voltage.

It is suggested that some form of compressed amplitude modulation be used in the final so that a very much compressed amplitude of the original envelope is impressed on the final signal. The signal will now be cut off between sounds. The final result should sound like side band with RF clipping.

Very briefly a compressed amplitude curve could be obtained by the formula  $\frac{A}{a + A}$  where  $a$  is a small constant value

as compared with  $A$  peak. This is suggested by the dotted square on fig. 10. See also system 5 and equation (8).

To be concluded.

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## Afterthoughts

### EXPERIMENTS IN MODULATION AND AUDIO — Part two

The symbol  $\Theta$  is intended to be Theta. Equation 1 should have read  $A \sin \Theta \times A \cos \Theta = \frac{1}{2} A^2 \sin 2 \Theta$ . Equation 3 should have read:  $\pm \sqrt{A - A \cos \Theta} - \sqrt{2} A \sin \frac{1}{2} \Theta$ . The  $\sqrt{A}$  should appear before every  $\sin \frac{1}{2} \Theta$ .

an AR special

# WIA Submission to the Independent Enquiry into FM Broadcasting

In December last year the Federal Government announced the terms of reference for an Independent Enquiry into FM Broadcasting. The WIA, through the VHF Advisory Committee, prepared and presented submissions to the Enquiry with a twofold purpose. Firstly to present an argument that in the public interest the proposed FM BC service should be established in the generally accepted 88-108 MHz International FM band; and secondly to advance the standing of the WIA in the community.

The establishment of an FM broadcasting service has been considered by a number of enquiries over the years. These were held in 1941/42; 1957/58; 1971; and again in 1974. The first enquiries generally came out against FM, but in 1947 experimental stations were set up in Sydney and Melbourne, and later in Brisbane and Adelaide. In 1956 the TV service was established, and a 10-channel plan was used which kept the region 92-108 MHz free for use by FM if required. In 1959/60 the ABCB (after public hearings on TV licences) determined that 13 channels would be necessary for an adequate TV service. The Huxley Committee, on behalf of the PMG, allocated a number of new channels including those on 94-101 (CH4) and 101-108 MHz (CH5). This meant that virtually all the 88-108 MHz International FM band was lost to TV. At the 1971 enquiry, the ABCB decided that an FM service should be set up on UHF, either (preferably) between 470-510 MHz, or between 500-540 MHz. This was an unpopular decision in many circles, and when the Whitlam Government came to power it was decided to review the question once more.

Australian Amateurs are fortunate to have been given the opportunity to comment on that 1971 decision. Establishment of an FM service between 470-510 MHz would present a threat to our 420-450 MHz Amateur band. If that allocation were confirmed, the only direction for expansion of the 450-470 MHz land mobile band would be downwards. The 70 cm band is of great value to amateurs. It is the only band below 1 GHz which is wide enough to accommodate high definition TV and other broadband modes.

Afny serious lobbying from the top and

to make room for commercial land mobile services would ruin it.

We are equally fortunate that our own interests in not wanting the FM BC service to be set up on UHF could be strongly argued as being in the public interest as well.

Much of the opposition by the public to providing a UHF FM service was inspired by financial motives, and many owners of imported FM receivers wanted a VHF band service. However, notwithstanding the volume of dissatisfaction with the ABCB 1971 recommendation, their justification has not received much technical criticism. The VHF Advisory Committee subjected the ABCB report (the "Red Book") and their Technical Report No. 34 (1973) to close examination, and found some flaws in the argument put forward for UHF. A detailed submission was prepared and presented to the new enquiry, the essence of which is given below.

The Institute submission put the proposition that an FM service could be set up in the International FM band with very little disruption to TV services. This could be done if FM stations were co-sited with local TV transmitters, and in those areas which have TV on channel 5 the FM transmitters should be on the channel 4 frequencies. Conversely, where channel 5 TV existed, the local FM transmitters could occupy channel 4.

This proposition was considered to some extent by the ABCB in their Technical Report No. 34 — "The sharing of TV channels". This is a very detailed document, and is generally opposed to the idea of channel sharing. However, in the view of the WIA, the report did not present a convincing case against the basic idea.

When our proposal was put forward within the Committee, TV channel allocations throughout the country were then examined to find, in particular, the distribution of TV channels 4 and 5. Following this, a map study quickly pinpointed the one main problem area:— Wollongong — Sydney — Newcastle, with overlapping service areas. Thus any high power FM station set up on Channel 5 in Wollongong could be expected to interfere with the pictures of those in the overlapping service area trying legitimately to watch Newcastle channel 5.

A number of other places had channel 4 and 5 in adjoining areas, but in these cases the TV service was derived from

low power stations or translators, with limited service areas and no overlaps, so that co-siting of low power FM transmitters on unused channels would be practical.

It was proposed by the WIA that the NSW central coast problem could be overcome by changing the Newcastle channel 5 transmitter (an ABC station) to channel 6. This proposition was considered by the ABC in their 1971 enquiry into FM broadcasting. It was rejected because of adjacent channel and local oscillator interference problems which would prevent Newcastle viewers from watching channel 7 and 10 respectively from Sydney. The ABCB favoured channel 0 as the alternate channel for Newcastle channel 5 TV, but the WIA could not accept this proposal! The protection of the Sydney TV service for Newcastle viewers does not seem reasonable — no such consideration was given to Ballarat viewers who were trying to watch Melbourne's channel 7 when STVR was set up.

The WIA contended that if the above channel re-allocation was made, with some other minor adjustments it would be practical to establish an adequate FM service between 92 and 108 MHz throughout the country. The benefits of vertical polarisation for the FM service were pointed out. Mobile reception would be simplified, and mutual interference between TV and sound broadcasts would, in most areas, be made even less likely.

The proposals for co-channelling of FM and TV broadcasts put by the WIA have several advantages.

- The necessary spectrum space can be had at low cost. The cost of changing channels for a TV transmitter is not high, relatively speaking. Newcastle viewers upset by the change would hopefully regard the introduction of a quality sound broadcasting system as a reasonable compensation.
  - The interests of international uniformity would be maintained — the unknown and probably high costs of Australia being the only country to establish an FM service on UHF would be avoided, and the million or so owners of standard FM receivers would form a solid audience for the new service from its inception.
  - The threat to the 70 cm amateur band would be eased.
- Co-siting FM and TV transmitters must

be beneficial to broadcasters for geographic and (where masts can be shared) economic grounds. In the latter case the visual pollution of very high masts cluttering the horizon would be held to a minimum.

The Institute recommended that the FM service be phased in over a number of years. The early establishment of UHF TV was advocated as a means of ultimately closing down all channel 4 and 5 TV transmitters (and by the way certain other channels — notably 0 and 5A — could be relocated to UHF with benefit to viewer and amateur alike). Arranging for the ultimate transfer of these stations to UHF would make the entire 92-108 MHz segment available for FM throughout the country, should it ever be required.

The WIA case was presented to the Enquiry on 5/2/74 by members of the VHF/UHF Advisory Committee. They were Technical Editor (for AR) Bill Rice VK3ABP, assisted by the Advisory Committee chairman, Peter Wollenden, VK3ZPA. The main WIA case had previously been presented to the enquiry in writing, and the verbal submission mainly sought to clarify items by the written submission, and to comment on the ABCB Technical Report No. 34 (which document had impressed the chairman, Sir Francis McLean, with its detail).

A number of interesting items arose at the Melbourne hearing, including:

- (a) That the probability of the FM service being established on VHF seemed high, as was the likelihood of the Department of Transport losing its Distance Measuring Equipment (DME) allocation just above 200 MHz
- (b) The WIA submission was the only predominantly technical submission other than that of the Department of Transport, heard in Melbourne on that day.
- (c) All those presenting submissions witnessed in Melbourne favoured VHF for the FM service.
- (d) The land mobile "low-band" may well be moved to UHF, and the transfer of this service could itself pose a threat to our 70 cm band.

As this article was prepared, reports were just beginning to appear of the findings of the Enquiry. It is pleasing to note that the bulk of the WIA submission was accepted by the Enquiry — even to a recommendation being made on the early establishment of a UHF TV service. Of course, we have no way of knowing how significant our efforts were in achieving the final outcome, but there is satisfaction in having been on the "winning" side.

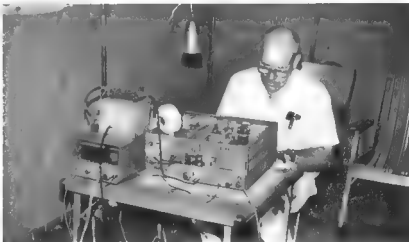
The Institute was thanked for having taken an active interest in the enquiry by a senior officer of the ABCB, even though the WIA had taken issue with certain of their technical proposals. From this incident it is apparent that the efforts of the Institute have also been worthwhile from the public relations point of view.

VK3ZDW

## MOORABBIN DISTRICT CLUB ON FIELD DAY 1974 - VK3APC/P MOUNT MARTHA



ABOVE: John VK3ANM, 60 and 10 metres.



ABOVE: Basil (the Brass Pounder) on 40 CW and Phone.

BELOW: Ray VK3BHL 160 metres CW and AM.



# a Six Metre Transverter

MIKE TRICKETT, VK3ASQ

8 Matlock St., Heme Hill, Geelong, 3220

This is the Six-metre version of the transverter described in the December issue of AR. The two transverters plus an FT200 or similar transceiver make up a complete VHF SSB installation.

From the block diagram, it can be seen that the transmitter section consists of four stages, an oscillator at 24MHz, mixer stage, driver and PA stages. The unit described produces in excess of 80 watts RMS into a 50 ohm load, with full carrier or tone in. As with the two metre unit a few criteria were kept in mind utilisation of the FT200 low level output and power supply, 28MHz as the IF, eventual dual-band operation with 2 metres. This transverter was constructed on the same chassis as the 2 metre unit. A 4 pole change over switch on the front panel facilitates band change giving 6 and 2 metre operation with a minimum of fuss.

## CIRCUIT DESCRIPTION:

The oscillator V1 produces 24MHz output. With this oscillator circuit, either a 12 or a 24MHz crystal can be used. The output has a double tuned circuit at 24MHz to minimise any 48MHz harmonic content. In the mixer stage the 24MHz and the 28MHz SSB, at about 1 watt PEP, are mixed. The resultant 52MHz signal appears at L4, and is then amplified by V3 and V4. Transmit-receive switching is accomplished

by switching the bottom leg of the two voltage divider networks from the -100 volt rail. With the relay contacts as shown, the full -100 volts is applied to the grids of V3 and V4 thereby cutting them off. When the relay contacts change-over on "transmit" the operating biases appear at the grids, -18V for V3 and -35V for V4.

The receive converter used was a VK3 VHF Group 6 metre converter. This uses an MPF121 in the front end, and is most stable, producing good results. No modification to the oscillator stage was required to allow external oscillator injection. A small amount of the transverter oscillator injection is coupled off by L2. A length of co-ax feeds this straight into the crystal socket on the converter and the oscillator transistor simply operates as an emitter follower.

## ALIGNMENT:

Dip all coils to frequency with a GDO, then switch the transceiver to TX position. Adjust VR1 to give -18 volts on the grids of V3 and check V4 bias as -35 volts. This should produce about 80mA of cathode current in V4.

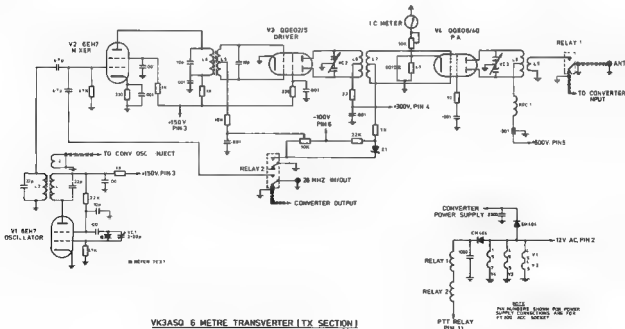
With an RF probe on the end of the co-ax from L2 adjust L1 for max and L3 for dip. With transceiver in tune position (full carrier or tone in) and absorption wavemeter near L4, peak L4 for max at 52MHz. L6 is then peaked in the same way. With a





wattmeter connected to the antenna socket peak VC3, L8 and the coupling of L9 for max. Now re-peak and adjust coupling of all stages for max output. It may be necessary to reduce the carrier/tone level of the transceiver to avoid overdriving. A word of warning—it is possible to tune the whole TX section up on the second harmonic of the oscillator i.e. 48MHz, if one is not careful. This is frowned upon as it could cause TVI to a certain TV channel! To avoid this, check each stage as it is tuned up, using the absorption wavemeter. Particular care should be taken with L4 and L5 tuning and coupling.

## DUAL BAND OPERATION:

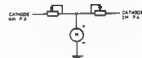
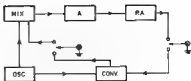
For dual band operation a 4 pole 2 position slide switch was mounted on the front panel. This was used to switch over the following connections: 12 volts to the receiving converters, 150 volts to the oscillator sections, 28MHz input-output and the transceiver PTT relay to either 6 or 2 metre relay coils. The converter outputs are wired in parallel. The 150 volts change over switch is also used to remove the 150V HT from the second half of the 12AT7 and the screen of the 12BY7 in the 2 metre oscillator section.

A common cathode current meter was used for both finals, with separate 10K trim-pots to each final cathode for meter calibration.



	<p>L1 - 14T 26BAS CLOSE WOUND 5/16 IN COIL FORM IN CAN SLUG TUNED AS FOR L1</p> <p>L2 - 2T 26BAS CLOSE WOUND 5/16 IN COIL FORM IN CAN</p> <p>L2 CONNECTED TO COAX LEAD &amp; BROUGHT OUT THROUGH SIDE OF CAN</p>
	<p>L4 - 10T 22BAS CLOSE WOUND 5/16 IN COIL FORM IN CAN SLUG TUNED L5-3+3T AS FOR L4</p> <p>1/2 IN SPACING BETWEEN</p>
	<p>L6 - 10T 28BAS CLOSE WOUND 1/2 IN DIAMETER</p> <p>L7 - 3+3T AS FOR L6</p>
	<p>L8 - 4+4T 18BAS 1 IN DIAMETER SPACED 1 TURN</p> <p>L9 - 3T 18BAS 1 IN DIAMETER WITH INSULATION</p>

COIL WINDING DETAILS



# a 5/8 wavelength Mobile Antenna

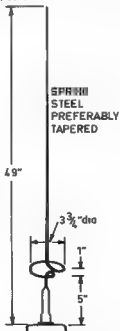
W. GEORGE FRANCIS, VK3ASV  
31 Donald Street,  
Morwell, 3840.

Here is an article showing a practical example of the 5/8 wave mobile aerial using a single turn bottom loaded coil suitable for 2 and 6 metre mobile net frequencies.

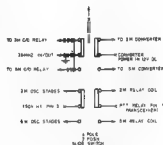
The original 5/8 wavelength mobile whip for the two metre FM net became popular around 1966 following an article in Amateur Radio, (1) which used a small base loaded multi-turn coil wound on a fibre glass rod or tubing which supported the vertical radiator in the form of a wire or braid, in turn covered over and protected by PVC tape or shrinkable plastic tubing.

The author studied mobile aerial design including research into overseas designs (2) extensively from 1954. During 1968 the idea of using a 5/8 wavelength mobile aerial with a subtle difference came to mind. The difference was in the base loading coil, which as in the original design tunes the aerial to .75 wavelength resonance.

It was felt this coil could act as a mechanical spring, should the aerial get knocked by a tree branch, service station roofs, etc. Stan VK3ZPL (3) experimented and developed such a prototype, superior to the simple 1/4-wave whip and equal in performance to the original 5/8 idea. This new arrangement was found also to have a very good match on 6 metres with near



STANDARD VHF MOBILE  
ANTENNA BASE AND  
FERULE



NOTE: COILS MUST BE WOUND IN PARALLEL

INTERCONNECTIONS FOR DUAL BAND  
TRANSCIVER OPERATION

unity gain, acting as a base loaded 1/4 wavelength whip on that band.

Since the many Eastern Victorian and Melbourne amateurs have used this aerial with considerable success.

It is now commercially produced for U.S. amateurs. (4) For further technical information and polar diagrams refer to the recent article in Amateur Radio. (5)

The 5/8 whip can also be used with a ground plane on top of a tower and forms an excellent low angle base station aerial (6).

## REFERENCES —

- "5/8 Wavelength Vertical for Two" AR July 1964.
- "Vehicular Advanced design gain Antenna", Cat. 251-400 Communication Product Co. U.S.A. 1968
- "5/8 Wavelength Whip for 164 & 174MHz", type RT, Associated Aerials Ltd., Kent, U.K., 1967.
- see VK3BAB, G4BHN.
- "6 and 2 metres antenna" Cat. No. 251-509-2.1db gain 2m., unity gain on 6 Philips Dodge Communications Co. Advert. Page 12 CD, June, 1970.
- AR September, 1970 "5/8 Wavelength Verticals" by WAGNV also CQ Magazine, May, 1970.
- As used by VK3AJK, VK3BBS, VK3ADB & VK3ZUN

# Multi-channel Switching for the Vinten MTR 13 MORTON P. DAVIS, VK3ANG

Here is a concise step-by-step procedure for producing your own 6 channel Vinten MTR13, MK2.

**STEP 1—Re-location of Heat Sink on power supply side of chassis.**

- b Remove under chassis components as necessary to gain access to the bolts holding Heat Sink.
- c Remove Heat Sink.
- d Drill and tap two new 5/32" diameter holes in the Heat Sink so that it may be relocated on the existing mounting bolts and moved to the side of the

chassis by 56"

- f. Reconnect leads to transistor.

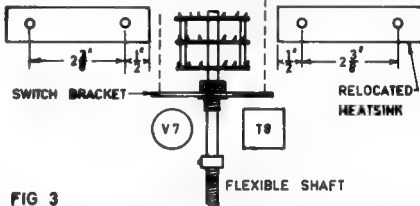
### STEP 2—Modification of Switch

- b Remove excess of holding bolts and flatten the shaft.

of each Heat Sink as shown in Fig 3.

**STEP 7—Manufacture of bracket to hold**

- 1



- c Do not reduce the length of the shaft at the front of the switch

### STEP 3—Relocation of Switch Shaft

#### STEP 4—Manufacture of Bracket to Hold Switch

- Cut out and file to size.
- Drill holes, cut notch and de-burr.
- Bend

### STEP 5—Mounting of Switch

- b. Centre punch chassis as required to mount switch bracket.
- c. Remove under chassis components as necessary and drill two 1/4" diameter holes.
- d. Shorten switch shaft as necessary and join to flexible shaft.
- e. Mount bracket to chassis with 1/4" x 6BA bolts, or 1/8" Whitworth bolts.
- f. Replace under chassis components.
- g. Fit bush to front panel and fit knob.

### STEP 5—Modification to Heat Sinks

11. <http://www.fishbase.org>

5. Note that some dimensions may require slight modification to suit particular crystal socket strips.

- b. Cut out and file to size.

**STEP 6—Mounting of crystals.**

- b Place both brackets on the spacers on the Heat Sinks.

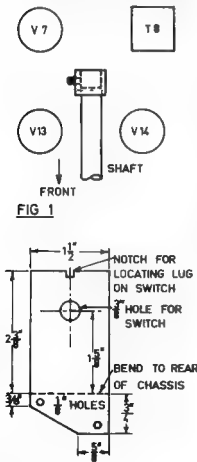
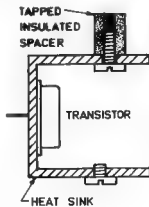


FIG 2





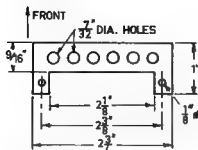


FIG 5

d Check clearance. The top of the crystals should be no higher than the power transformer. If necessary reduce height of spacers.

#### STEP 9—Mounting of Trimmers.

- Remove socket strip and trimmer brackets
- Mount trimmer to bracket taking care not to fracture the ceramic.
- Make sure trimmers are bolted on tightly.
- Check that trimmers are clear of Heat Sinks and transistor lugs

#### STEP 10—Wiring of new components.

- Wire sockets to switch.
- Wire trimmers to sockets.
- Receiver wiring crystal oscillator V4, will be as for X1 and C33, 6 times.
- Remove X1 socket and C33 trimmer from chassis. Fit a tag strip underneath to connect wiring and components removed from X1 and C33.
- Wire transmitter carrier oscillator, V13. This is as for X2 and trimmer C80, repeated six times.
- Remove X2 socket and trimmer C80 from chassis.
- Fit a tag strip underneath to connect wiring and components removed from X2 and C80.

#### STEP 11—Mounting of Crystal Assembly

- Mount assembly on the Heat Sinks.
- Earth both trimmer brackets to chassis.

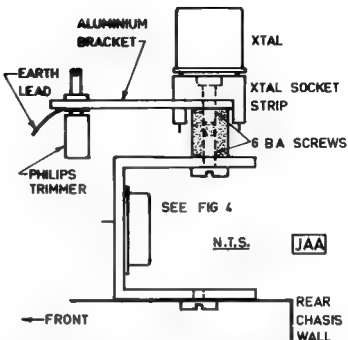


FIG 6 SIDE VIEW OF COMPLETED ASSEMBLY

#### STEP 12—Wiring of Channel Selector into Circuit.

- Connect switch to the tag strips as in 10D and F using the inner conductor of RG58 co-ax.
- Take these leads through the holes in the chassis that were occupied by X1 and X2 previously.

#### STEP 13—Alignment.

- Switch on your MTR13 MK2.
- Tune to frequency with trimmers.

#### PARTS REQUIRED

- 1 x Oak Switch MSP type F, AK 52267  
1 section, 2 pole, 6 position.

- 1 x 8" Flexible shaft with panel bush to suit 1/4" shaft.
- 2 x McMurdo Moulded Crystal Sockets—part number 998/P12/UG.
- 12 x Philips Ceramic Trimmers part number CO04EA/12E 3-12PF
- 4 x 1/2" Insulated Plastic Spacers tapped for 6BA screws
- 4 x 6BA x 1/2" Bolts
- 6 x 6BA, 1/4" Bolts.
- 2 x 6BA Nuts
- 1 Piece of 18g aluminum for brackets, about four inches square
- 2 x 3 Lug tag-strips.

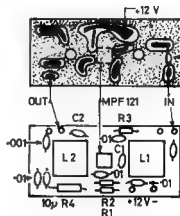
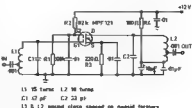
## Pre-amplifier for 28 MHz

Values are given for the 28MHz band; however, by changing L1 & L2 to resonate at the desired frequency, the pre-amp can be made to improve the performance of any receiver on any band

Suggested layout of PC board is shown actual size

(If 5% components are used, the G2 bias values given are satisfactory. However, if R2 is increased to 100k, then resistors with 20% tolerance could be used. R3 may need to be adjusted to give a coarse current of 5mA. Technical Ed.).

Reprint from GARC, Nov 1972





## a Solid State Front End

**I. W. COWAN, VK3ZDW**  
31 Daly Road, Murrumbidgee, 3163.

(Reprinted from the Victorian VHFER, July 1972.)

Every VHF operator needs a tuneable IF. Thanks to the many IC's available IF and audio sections are easy to build. The unit described here is a high performance front end for your favourite IF strip.

Shown in Fig 1 is the circuit of the front end unit which I use in my tunable IF and which feeds a slightly modified EA240 solid state IF strip. The unit tunes 9.0-11.2MHz. Its image rejection is reasonable and the gain is sufficient to operate

the EA240 noise blanker from a WIA 2 metre FET converter.

Frequency coverage and dial linearity are dependent on oscillator circuit and tuning gang. The oscillator is a Colpitts type chosen for best stability and low "bridle" generation. However, this has a fairly large permanent shunt capacitance. To obtain a reasonably linear dial scale, a gang with a circular profile is used as a square-law gang would result in cramping at the low frequency end. The gang used is a high quality 3 gang double spaced unit which was available from a source in

Lonsdale Street, Melbourne. Its maximum capacity is around 150 per section.

I spent some time fiddling with the oscillator to make sure it was free from drift, culling, and "birdies". Oscillation is not violent, but it is completely reliable, and stability is quite good enough for easy SSB copy. The oscillator buffer serves two purposes—firstly, to permit an appropriate injection level to be set for the mixer, and secondly, to isolate the oscillator from the RF and mixer stages and prevent "culling".

AGC is applied to the RF stage by means of a JFET in the source. I tried feeding AGC to the AGC gate but this was difficult using the negative-going AGC from the EA240 IF. The MPF102 works quite well in this application.

The front end unit is built up on a "U" shaped aluminium bracket. The oscillator is on one side, coils, gang and RF FET are in the centre, while the mixer is on the other side. The coils associated with the RF stage input and output are separated by a few inches and are mutually perpendicular. The RF FET is mounted directly on the gang and all by passing associated with this stage is returned to one point on the gang.

Tuned windings are all 25 turns of 30 B & S close wound on 5/16th slug-tuned formers. Primary windings have 2 turns and 5 turns for input and RF coils respectively.

Tune-up is simple. First the oscillator is set up for correct range. Then the RF stage slugs and trimmers are set for best tracking. The RF coils peak sharply, and tracking is quite good.

One final comment. MPF121 FET's make excellent amplifiers and mixers. However, they do not equal the old 6BA6-6BE6 combination for immunity to cross-modulation. A few db of attenuation which can be switched in ahead of the RF FET works wonders here.

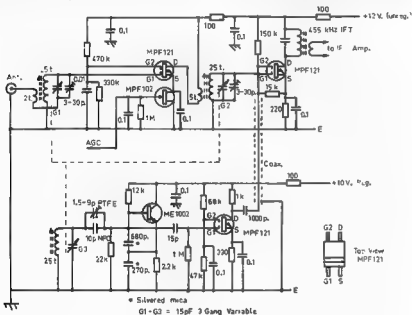


FIGURE 1. CIRCUIT DIAGRAM FOR TUNABLE FRONT END

# FM Discriminator Meter\_\_\_\_\_

This circuit can be connected at all times without any effect on the receiver audio. Almost any  $\mu\text{A}$  or  $\text{mA}$  meter will do. The 4.7 megohm resistor ( $R_1$ ) is of nominal value, and will be required to be altered to obtain a centre reading on the meter.

The meter used by the writer is a small tape recorder type of approx 250 $\mu$ A.

If necessary, adjust R2 so that not too much current is passed through the meter. A 9 volt (approx) zener diode is used to

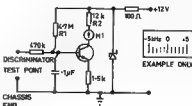
regulate the circuit.

Almost any NPN silicon transistor will work.

## NOTTING ME

Check at discriminator test point on the carphone that the discriminator transformer is set correctly on frequency by the usual multimeter method.

Connect DC amplifier circuit and adjust RI for centre reading on M1. ●



# Amateur Operators Certificate of Proficiency Examination

## February 1974

### TELEGRAPHY SECTION L (RECEIVING)

(Speed — 10 words per minute)

Gales lashed Bass Strait over the weekend with winds of 80 knots causing delays to some shipping of almost 12 hours. Passengers reported waves of nearly 25 feet wash over the bow of their ship. Seasoned sailors have said this 173 mile stretch of water between Tasmania and the mainland can

### SECTION L (SENDING)

(Time allowed 2½ minutes)  
(Speed — 10 words per minute)

Most of the 249 passengers aboard one ship which arrived at her destination on 13 hours late were showing the effects of about 25 sleepless hours

### SECTION K (Regulations)

(Time allowed — 30 minutes)

**NOTE.**—THREE questions only to be attempted. Credit will not be given for more than THREE answers. All questions carry equal marks.

- (a) Under what circumstances would the general call "CQ" be used?  
(b) Give an example of a telephony call using "CQ".
- (a) State the regulatory requirements regarding the inspection of amateur stations.  
(b) What documents should be made available for inspection at the amateur station?  
3 Describe the method of resuscitation you would give to a person who has suffered an

electric shock. Your answer should include the steps you would take before commencing resuscitation.

- 4 Give the meaning of the following abbreviations.—  
QRA QSB? QRU QSA? AS

### SECTION M (Theory)

(Time allowed — 2½ hours)

**NOTE.**—SEVEN questions only to be attempted. Credit will not be given for more than SEVEN answers. All questions carry equal marks.

- 1 (a) Draw the circuit diagram of an amateur station transmitter suitable for operation in the 144-148 MHz band. Explain briefly the theory of operation of each stage of the transmitter.  
(b) Describe how you would tune the transmitter described in (a).
- 2 (a) Explain possible causes of interference to television receivers from amateur station transmitters.  
(b) Discuss with the aid of diagrams the technical precautions you would adopt to avoid interference from an amateur transmitter to television and broadcast receivers.
- 3 With the aid of a circuit diagram, describe the operation of the "product detector" stage of a receiver designed for the reception of single-sideband suppressed-carrier radio-telephone signals.
- 4 (a) Aided by a sketch or circuit diagram, describe an aerial system for use in the 7 MHz amateur band capable of correctly loading a mobile transmitter while in motion.  
(b) Indicate the areas in a motor vehicle from which noise may be radiated and picked up by the receiver. Suggest means of reducing or eliminating this radiation.

- 6 (a) What are parasitic oscillations and how are they produced?  
(b) Why are parasites undesirable in a transmitter?  
(c) Explain the methods you would adopt to locate and suppress them.
- 6 (a) Discuss features you consider desirable in a microphone suitable for use at an amateur station.  
(b) With the aid of a sketch describe the construction and theory of operation of a microphone which you consider meets these requirements.
- 7 With reference to the propagation of radio waves explain what is meant by the following terms:—  
(i) vertical polarisation,  
(ii) critical frequency,  
(iii) temperature inversion, and  
(iv) skip distance.
- 8 (a) Aided by a circuit diagram describe the operation of a Grid-Dip Oscillator or a Transistorised-Dip Oscillator.  
(b) Indicate the reason for loosely coupling the oscillator described in (a) to the circuit being measured.
- 9 (a) Explain the theory of operation of grid-leak bias when used in the final stage of a transmitter.  
(b) If the required bias is 45 volts, of which 18 volts is supplied by an external source, what grid current is necessary to provide this extra voltage if the grid resistor is 2,700 ohms?

## A Touch of History

### AMATEURS AND THE PACIFIC FLIERS Department inquires into interference

Mystery surrounds the identity of the wireless man on which last night interfered with 3LO when that station was picking up wireless messages from the Southern Cross plane.

It was stated that when 3LO asked certain wireless amateurs and experimenters to cease interfering with a signal coming from the plane, one station replied "Go to hell".

Today the studio manager for 3LO (Mr. Bearup) said that the interference was reported to him. On the other hand, well known amateur wireless operators who listened last night, deny that there was any interference.

The Postmaster-General's Department is conducting an inquiry and the Chief Controller of Wireless Services (Mr. J. Malone), said that he hoped to be in possession of the full facts late this afternoon.

#### "Interference Very Bad"

"When the interference was reported to me," Mr. Bearup said, "I got in touch with the PMG's Department and with their concurrence made a request from 3LO for the interviewers to come. That was at 8.45 p.m., and the amateur who knows how to use his set, but to those causing interference by radiation, who, as they probably could not read Morse were wasting their time.

"The interference was very bad from 8 to 8.45, and I made the first request at 8.15, repeating it several times later on. About 9.30 the interference ceased considerably, and from then on we had no great trouble.

"It was reported to me that someone had sent the reply, 'Go to hell', but whether it came through the air or by telephone I do not know. Until I see the operator on duty last night our hands are tied."

#### "Merely a Clunk"

The president of the Wireless Institute of Australia (Mr. Howard Love) said that he was listening in from 7 to 11 p.m. yesterday, and was not bothered by any interference. In his opinion, the attempt to blame transmitting amateurs and owners of oscillating receivers for interference was merely a cloak for the defectiveness of the receiver. Anyone who could not pick up KHAB (the Southern Cross), should have their receiver overhauled, for the signals were coming in perfectly all the time he was listening.

Mr. B. Herd (secretary of the Institute) said that only at one period during his watch, from 8.30 p.m. last night, until 11 a.m. today, did he hear an amateur station operating close enough to the wavelength of KHAB to cause interference. That was at 8.45 p.m., and when the amateur was informed he shifted his length to 30 metres. KHAB operated on 33.3 metres.

One other transmitter was heard on the 33.3

metre wave — an American Navy ship sending greetings to KHAB and transmitting only during the times when the latter was on the air.

On several occasions, when important transmissions have been sent on the short-waves, amateurs were blamed for interference, but in this case the leading Australian amateurs were listening for the Southern Cross, and he was justified in backing their opinion that no amateur station was responsible for the interference.

#### U.S.A. Stations Cut In

Mr. Jack Simms, of East Melbourne, who has received practically all messages from the Southern Cross, said that last night he heard no interference from local amateurs, although one earlier in the afternoon had to be told, and willingly obeyed, the instruction to shift off KHAB a wave-length.

He had, however, been interfered with by 6XS and 2XAR — American commercial stations, the former at 5.5 p.m. yesterday cutting in and completely obliterating one long message from the plane.

Another well-known amateur, Mr. H. M. McCubbin, said that he had been told by a wireless operator from an overseas steamer that last night, when one local station was operating, it would have drowned messages from the plane.

Amateurs pointed out that the interference could have come from any station anywhere in the world.

Reprint, Malt. "Herald",  
June 5, 1958

# Newcomers Notebook

with Rodney Champness VK3UG

44 Rishmellen Rd., Boronia, Vic., 3185

This month I have a correction for the February column, a method of reducing 6 metre interference to Channel 8 TV viewers, and some hints from VKSTL.

## CORRECTION

I wouldn't be surprised if you had trouble understanding a small section of the first paragraph in column three, February issue, page 28. Portion of the paragraph was missed out and here is the correction for it. Look towards the bottom of the paragraph. The correction is as follows: Incidentally this end of the resistor doesn't have to attach to the coil, it can go direct to earth. If the oscillator is not working check that voltage is being applied to pins 5 and 6 and that a voltage drop across the cathode resistor of up to about a volt is measured. This should make this section easier to understand.

## SIX METRE AMATEURS AND CHANNEL 8 VIEWERS CAN CO-EXIST

Recently I spoke at length with John Patterson, VK3ATQ of Berwick on the problems that beset 6 metre amateurs in channel 8 viewing areas. John has suggested that a net channel be established in Victoria at the top end of 6 metres. It is understood that VK4s already have a net channel on 53.995 MHz, so it is suggested that a net be established in Victoria on this same frequency. Initially at least it would be an AM frequency but as time and techniques advance SSB may also become a common mode on this frequency. Crystal locked transmitters and receivers are thought to be the initial answer to the technical requirements on this frequency. A Yaesu FT-620 or a Midland 13-894 with transverter would make ideal units for this type of operation and are available, as far as I can tell, from a couple of our advertisers.

Some say this idea of going to the top end of the band will not reduce interference to television sets tuned to channel 8. With an average television set, or any ordinary radio for that matter, the principle of getting as far away from the frequency of the signal causing the trouble to reduce its effect is well known. The sensitivity of the television set at 52 MHz is perhaps 6 to 12 db greater than at 54 MHz when tuned to Channel 8.

Hopefully then, if you transmit somewhere near 54 MHz you can expect to be able to run 4 to 16 times as much power — 6 to 12 db — as at 52 MHz for the same amount of interference into TV sets. If you have no interference problems because you use low power, you could increase your power by the factors above without creating interference. It may hap-

pen though that the television sets concerned are being overloaded by your signals, whether you are at 52 or 54 MHz. In this case a trap will be necessary on the affected television set.

There is much that can be said about the 6 metre — channel 0 problem; much of it has been said before and there is, I believe, much still to come forward in the way of trap designs, technical standards for television sets, and education of the public. Further reading on this problem can be seen in this column for January 1973 and 1974.

I wholeheartedly endorse the move to 53.995 MHz as a new 6 metre net frequency. It is a positive step forward to reduce interference whilst still staying on 6 metres. Six metres is a fascinating band to operate on; it has most of the features of the HF bands and the interesting aspects of the higher VHF bands. I suggest that you contact John VK3ATQ if you want further information on this new network. Perhaps our VK4 friends can give us some idea on how well this move has worked for them!

## SOME HINTS AND COMMENTS FROM VKSTL

Tom suggests that an erinold knitting needle, size 3, which is about the same size as a 1/4 inch drill, would make an excellent extension shaft, and may well have advantages over a metal shaft as it is non metal and non conducting. It is cheaper but possibly would break more easily. Front panel bushes may be obtained from discarded potentiometers. The former that plaster of paris bandages are wound on are suitable to make spacers from. Have you a friend in the medical

profession who could obtain these throw-away items? Another useful plastic strip is the one that artificial teeth are supplied to Dentists on. They are about 2 1/2 inches long.

The octopus straps, as used to hold surf boards on roof racks, etc., make good straps for holding down mobile gear. Tom uses a set of the shorter ones to hold his 6 metre equipment down. I assume that the equipment is held down on the seat, Tom doesn't make this point clear. It is a very good idea, however, as sharp cornered amateur transceivers would not be fun flying around in a car unfortunate enough to be involved in an accident.

Some time in the past Tom had a 22 set which is very similar to the 122. Tom's comments are sparked off by my article on getting rid of chirps from the 122, which was in February's issue. On the particular set Tom owned the 300uF 16 volt capacitors were defective. I would suggest additionally that all electrolytics in the set and its power supply be checked. With these defective Tom was getting a "chirp" of 4kHz. You may well have to do both modifications if you own a 22 or 122.

Thank you very much indeed Tom for your comments and ideas. I am sure others will find them of value. Supposedly the comments on the 22-122 should not appear in this column, however, knowing how to spot faults in your equipment is part of becoming proficient in electronics. The question now is why should a faulty electrolytic cause extremely bad chirp on a CW signal? That is something for you to figure out. If you want to know, write to me and I will discuss it in this column.

## Try This

with Ron Cook VK3AFW  
and Bill Rice VK3ABP

### "A QSO FILING SYSTEM"

I have received many "on air" requests for information on the filing system used at my QTH. It was suggested a short article on my system may be of interest to other members.

The cards I use are standard office stationery lined cards, and measure 6

inches by 4 inches. They are laid out as shown in the diagram, and are filed alphabetically by prefix and call-sign.

One advantage of such a system is that a quick check through the cards can reveal a particular operator who has built, or is using some piece of equipment that you are interested in. Once identified, it only takes a short note through the mail to the operator of the station to enquire or obtain a circuit etc. I have found this filing system useful already in this regard, and a quick check through the cards reveals just how popular the FT200 and tri-band beams really are!

CALLSIGN OF STATION WORKED OPERATORS NAME QTH OF STATION

LOG BOOK QSO  
NUMBER & DATE

VKSJE  
217  
1049

8/9/70  
4/11/73

JOHN  
POORAKA S.A.  
FT200  
TRAP DIPOLE  
BUILDING LINEAR

EQUIPMENT USED

NOTES

ASK HOW LINEAR TURNED OUT

QSL SENT

QSL INFORMATION

## Commercial Kinks

with Ron Fisher VK3OM

3 Fairview Ave., Glen Waverley, 3155

This month a few notes on the Heathkit transceivers SB100 and SB101. Although not as common as many of the Japanese transceivers, these rigs are usually highly prized by their owners and in general command a relatively high price on the second hand market.

The first of the series, the SB100, was first released in late 1965, and in common with the other Heath 'SB' gear released a few months before, featured a new quality in kit type gear. It seems that perhaps Heath looked closely at the Collins range and borrowed a few of their outstanding features. The SB101 followed in 1968 and now had provision for an optional CW filter. The still current SB102 is identical in all respects except that the VFO is now transistorised and the receiver front end has been slightly hotbed up. Apart from the VFO, the first SB100s can be up-dated to the latest specifications.

For SB100 owners here are the simple modifications to update to a 101. Change the following components:

- R221 from 470 to 100 ohms.
- R927 from 220 to 100 ohms.
- R928 from 150 to 56 ohms.
- R104 from 47 to 56 ohms.
- R105 from 47 to 56 ohms.

Insert a 4700 ohm 1 watt resistor between ground and the ground end of the 10K BIAS ADJUST potentiometer.

Connect a 0.005 disc ceramic capacitor from the B+ connection to the LMO to ground.

If you are using a home made power supply for your 100 to 101 make sure that the 300 volt supply is right up to the mark. In fact it is better to be a little on the high side and up to 325 volts is recommended. The higher voltage will improve both receiver gain and transmitter output. If the receiver audio output appears a bit low, gain in this section can be increased considerably by removing C926, a 0.05 negative feed back capacitor between pin 7 of V14b and the audio output transformer T301. Now add a 100 mfd electrolytic capacitor (25 volt) from pin 7 of V14b to a convenient ground point.

Receiver gain and signal to noise ratio was improved in the SB102 by changing the RF stage tube to a 6HS6. This tube does not seem to be obtainable in Australia, however the 6AH6 appears to have almost identical characteristics and is in stock at most dealers. I have also found that substituting a 6AH6 for the 6AU6 first receiver mixer gives a very worthwhile gain improvement.

One problem that seems to crop up with most of these transceivers is the inability to zero the 'S' meter. Heath make the following suggestions. "Very likely the meter problem could be caused by a defective tube at V3 or over injection from the heterodyne oscillator into the mixer stage. We suggest that you reduce your heterodyne oscillator injection as a possible corrective measure".

Look into the above as a first resort, but in many cases it has been necessary to replace resistors associated with the 'S' meter circuitry with high stability components.

If you wish to add the CW filter switching to the SB100 a kit is available from Heath to do the job. However, as the normal SSB filter has to be replaced with one of smaller physical size, the price is rather higher than might be thought. The kit has a Heath part number of SBA-100-2.

Low mike gain is another common complaint. The first way to overcome this is to use a high output microphone. The very cheap lavalier type crystal microphones appear to be a good choice.

It may also be possible to increase the gain of the microphone pre-amp stage V1a. If both R1 and R2 were increased in value to 470K and 1M ohms respectively a worthwhile increase in gain should result.

Many of the modifications discussed above may also apply to the Heath HW100 series as all circuit boards of this model are common with the SB101.

Next month it's back to two meter FM with a regulated power supply for your state transceiver.

## Magazine Index

With Syd Clark, VK3ABC

As you can imagine, due to the uncertainties of mail, the work load varies somewhat from month to month. For this month our lead is quite light with only four magazines to be mentioned in our index. A number of foreign language magazines come to the Institute and although some of these sometimes contain material worthy of mention, translations, especially technical translations, are not easy to come by.

**CG February 1974**  
The Low Profile Quad Antenna. Radio Communications in Primitive New Guinea. Results of the 1973 CG World Wide WPX SSB Contest. Ten-Tec Model 315 Receiver (Review); Oscar News & Orbital Data; SSTV

**NAH RADIO: October 1973**  
Electronic Key with Memory; Audio-shift RTTY Keyer; Touch-Tone Decoder; Two-band Antenna Matching; RF Power Meter; Advanced VHF Pre-selector; Half Wave Rectifiers; Frequency Measurement of Received Signals; Electronic Bandpass Tuning

**RADIO 28: January 1974**  
Workings of the World Ignited VHF Repeater Aerial System; Quartz Crystal & Frequency Standards; Mobile BFRF to mobile PFF

**RADIO COMMUNICATIONS: February 1974**  
Top Band Conversion for the KW Victory 111A. The 5-Square. A new VHF & UHF Aerial, A Digital Morse Code Generator; Technical Topics: this month's space is devoted to new approaches to AM reception; a cunning RF wattmeter, Japanese Component Markings and High Pass Filters.

## Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publisher

Editor,  
Dear Sir,

GD NIMON

In addition to the Hitachi books on the Japanese language mentioned by VK3RB in the March 1974 issue of Amateur Radio, there is another source of information readily available to the amateur fraternity.

Radio Japan broadcasts a weekly 15-minute session for beginners called 'Let's Learn Japanese' and one for more advanced students called 'Let's Practice Japanese'.

Frequencies used for these broadcasts are subject to change throughout the year, but up until at least May 4, 1974 the schedule is as follows:

Let's Learn Japanese				
Service	Day	Time GMT	Frequency MHz	
Aust. & N.Z.	Tue.	1005 - 1019	15.235	
		1005 - 1019	11.876	
General	Tue.	1015 - 1029	15.195	
		1415 - 1429	11.816	
		2315 - 2329	15.195	

Let's Practice Japanese				
Service	Day	Time GMT	Frequency MHz	
Aust. & N.Z.	Thu.	1005 - 1019	15.235	
		1005 - 1019	11.876	

'Let's Learn Japanese' consists of a full year's course and will be re-commencing in April 1974. A last book covering all of the lessons is available from Radio Japan on request to: Nippon Hoso Kyokai Tokyo

A. S. Hollebon,  
VK3BG.

## Intruder Watch

with Alf Chandler VK3LC

1536 High Street, Glen Iris, 3146

By the time this is in print I shall be in Japan. The XYL and self sail in the "Marco Polo" for a six-week cruise around the Orient on April 17th returning in June. I hope to contact some Amateurs interested in the Intruder Watch in Japan, Hong Kong and Singapore and will be plugging for co-operation from them.

As I have not had the co-operation desired with the 3.5 MHz IW slide monitor I am discontinuing them, and instead substituting individual slides. So far I contact VK4XK on 14190 kHz at 2330 GMT on Thursdays our date, and with VK8DA on 14130 kHz at 0030 GMT on Sundays. I hope other states will co-operate. With the departure of our VK2 co-ordinator, Bill VK2ZO for a while in Haiku, a vacancy has been created in that state. I do hope some enthusiastic member will fill the gap. We do need enthusiasm.

A recent report by several VK8's of a spurious signal from the voice of Amateurs (Philippines) in the 14 MHz band, and related by me to my friend in the U.S. caused quite a stir there. I don't think we shall hear any more spurious signals from that source.

An interesting, though disquieting, fact can be obtained by reading pages 63 to 86 in the publication by Wireless World, London "Guide to Broadcasting Stations, 17th Edition". From 7000 kHz to 7150 kHz there are 153 Broadcasting stations listed, and they are by no means all from Britain or Communist China stations. Food for thought, eh?

On my return I shall give you an account of what transpired between myself and the various Amateurs I was fortunate to meet.



# Contests

with Peter Brown VK4PJ

Federal Contests Manager G.P.O. Box, 638  
Brisbane, Qld., 4001

## A FEW GENERAL NOTES ON THE CONTEST

Reports tell me that the contest was friendly and of course most enjoyable. A few home stations mentioned that they will be in the contest next year.

## RECEIVED WE HAVE A MAJOR ESCAPEE

We went forward by 1.4 per cent or if you wish ONE log. 70 logs this year, 60 last year. Fortunately we are up one log in field stations. Some of those missing field station logs would have given us a marked improvement.

If it is good to note that multiple op stations are up.

Thanks for all the comments and letters. Every one of interest. I'll tidy up the rules and next year will be another great get together.

## CONTEST CALENDAR

May 11th World Telecommunication Contest CW

May 11th YL ISSBers QSO party CW

May 18th World Telecom Contest Phone

May 18th YL ISSBers QSO party

May 31st - June 3rd: CHC/FHC/HTN QSO party

June 15th-19th: All Asian phone Contest.

## AUGUST

## REMEMBRANCE DAY CONTEST

THE FRIENDLY CONTEST. Make it the greatest yet. 800 logs. We'll make it . . . If you send in your log, and get someone else, who has been missing out, to join us. Date in next month's Amateur Radio CQ CONTEST.

As I write this the contest is in full swing. At the time I was on, 15 metres was the only band of interest. Some QSB on the We and Ka and the JAs were starting to come in . . . I may get a chance later.

Did you know that Martin VK4VU, a great contest man, came fourth in the world in the year's QSO 888 contest. Congratulations.

## YL ISSBers QSO PARTY

QW 0001 GMT to 2400 GMT May 11th.

phone, 0000-0400 GMT Sunday, May 19th.

CW 24 hrs, one 8 hour rest period.

phone, 48 hours, two 8 hour rest periods.

Rules are lengthy and are available from W7EOI.

. . . but you can join in.

Frequencies: CW 3685 7085, 14070, 21070.

phone, 3573, 7273, 14533, 21373, 28673.

DX on 3775 and 7080.

Logs to L. W. Coleman, W7EOI, 412-19th Street.

SW Great Falls, Montana, 59404.

## WORLD TELECOMMUNICATION CONTEST

QW 0000-2400 GMT Saturday, May 11th.

phone, 0000-0400 GMT Sunday, May 19th.

Single op stations 160 through 10 metres.

Exchange: RS/RST plus 10 ITU zone.

Scoring: 10/15/20/40 80/160

Same country 0 0 0

Other countries, same zone 1 1 2

Other zones, same continent 2 2 4

Other continents 3 3 6

Final score: Total QSO points X different ITU zones worked

Same station may be worked each band for QSO points but zone counted only once.

Log entries in order . . . Time GMT, station worked, exchange SAR, band, continent, zone, QSO points

Awards: Diplo-mas to the three highest scoring stations in each country. Separate awards for CW and phone

Mail logs before June 30th to: Ministério das Comunicações, DENTAL, 70000 Brasília, DF, Brazil.

## SOME NOTES ABOUT THE COMMENTS RECEIVED

Age a thanks for all the comments . . . especially those on rules. By the time you have read this, Federal Council will have appointed a new Federal Contest Manager because I have completed the three year term planned. However your aforementioned comments will be passed to him . . . and the corrections made.

# 1974 JOHN MOYLE MEMORIAL NATIONAL

## FIELD DAY RESULTS

### 24 HOUR DIVISION

Section (a) Tx phone

VK3AUQ 1162  
3BMA 340  
VK4AE 2975  
4AL 1495

Section (b) TX CW

VK3ANU 1154  
VK3J1 572

Section (c) Tx Open

VK3BJ 1686

Section (d) Tx Multiple Open

VK1ACA 8288 12 ops  
1W1 4080 6 ops  
2W3 2384 9 ops  
3APC 8742 13 ops  
3ATL 5387 5 ops  
VK3ATM 9101 9 ops  
3AW3 2736 9 ops  
3KX 1658 4 ops  
4WIT 2731 18 ops  
8DA 2619 6 ops

Section (d) Tx Multiple phone

VK3AMR 708 3 ops  
8LW 1880 8 ops  
VK3X1 825 3 ops

Section (a) Tx VHF

VK2YAV 686  
2YBT 618  
2ZCT 442  
VK3AVJ 619  
3TAP 616

Section (f) Tx Home Station

Section (f) Home Station

VK3RX 330  
8AXE 975  
3CM 730  
8BX 680  
VK3ZML 630  
3V 460  
SZT 805  
SOL 210

Section (g) Receiving

K. D. Cunningham 680

### 8 HOUR DIVISION

Section (a) Tx phone

VK1JG 320  
3BNC 640  
3EF 647  
3DY 537  
3HE 426  
3ZA 366  
VK388 210  
4GT 877  
4PJ 246  
5BW 814  
7AX 380  
7BM 280

Section (b) Tx CW

VK2YB 524  
3JN 218  
VK2TX 285

Section (c) Tx Open

NIL

Section (d) Tx Multiple

VK3JH 915 3 ops  
3BDD 854 3 ops  
VK3WIA 336 7 ops

Section (e) Tx VHF

8BX 272  
8JN 34  
VK3BW 64

Section (f) Home Station

VK2ZA 280  
3OW check  
3QK 848  
3RA 215  
VK3EM 40  
3ABJ check  
4UJ 525  
855  
8DV 436

Section (g) Receiving

S. Gillespie 1600  
P. J. Hall 710  
A. J. Everett 5JN  
E. Trebilcock 390 CW log  
J. H. Zinkler check

VK1AF1 was on a fire tower with a Swan 350, FT101B, MP6A, MTR13, MTR20, MP20A, Trio TR-2E, and a 1.5 KW alternator. David suggests moving the time forward a couple of hours as 7 pm is a bit late to pack and travel.

Good to see Christmas Island back with us again. VK3X1 powered with a 15 kVA Lister . . . Canvas set up, plenty of coloured lights, box of food 807s for visitors . . . seems up there.

VK3DA roughed it in a caravan converted bus with a 30 kVA?? alternator, 2 of Quad and 180 ft V beam.

SWL Peter Hall used a VK2ABQ triband beam. VK3ZHW, a lonely log, used an FT-27FM in his car and an FRV/PLX 420 + FT-2750 with a 240 volt alternator.

Alan VK3BW used a home brew petrol motor alternator.

WKSJW used 2 x FT101s, a KW2800, dipoles, helicals to 6 VHF Tx from a 2.5 kVA Honda.

John VK4IE remarked . . . "Activity seemed to be better than previous years with rule 14 undoubtedly helping here. As a matter of interest, deactivating all the points scored under rule 14 still leaves me with more contacts than last year . . . It was good to hear the same friendly (yet friendly) call signs from previous years."

Alan VK4AL hung one of his dipoles from a Miondy gun and powered his rig with a car alternator and lever throw motor.

Bruce VK3VF remarked . . . "Very enjoyable. Another nice friendly contest."

Drew VK3AMJ, who managed a nice CW score, would like to see /S or /P standardized, either call sign on portable operation.

Harold VK3CM . . . "A very enjoyable contest.

Most portable stations thanked the home stations for taking an interest. Signals were surprisingly strong from most stations, apparently their location was carefully selected. Hope to be in the field next year."

John VK3JH mentions "This year we took a young and enthusiastic group of SWLs with us and had a tremendous day . . . If next year a still half as good it will still be a great day."

Paul VK3ZML scored 830 points on one VHF channel.

VK3AW3 has a 5 kVA alternator to keep 6 Txs and 8 ops going.

"Thoroughly enjoyed by all"

VK3ATM on a 90 ft fire tower with a 10kVA diesel . . . (at the top)

VK3APC worked 8 bands including 435 and 1296 MHz and had 2 x 3kVA and one only 1kVA alternator

VK3W3 used a 5 kVA alternator and listed every contact's name

Anthony VK3ZGT used a 3 phase alternator mounted on a trailer

VK1ACA with 6 HF Tx and 4 VHF Tx had a portable tower and a 15kVA alternator

VK1W1 was 5782 ft up Mt GININI

There are many more comments but the mail closes soon. Don't miss next year!

## JOHN MOYLE MEMORIAL NATIONAL FIELD DAY RESULTS

Two more logs have been received 24 hour Section (a) Tx phone

VK3R 1603

6 Hour Section (a) Tx VHF

VK3ZF1 34

So now we have 3 logs more than last year



# TOWNSVILLE PACIFIC FESTIVAL: GUESTS LIST

(JURORS)

The aim of the contest is to foster an interest in the Townsville Pacific Festival, and to increase interest and activity on all Amateur Bands by Australian Amateurs.

It will be noted that a further effort is made in this contest to increase popularity of the CW mode of communication. Hence CW contacts count for double scores.

This year will be the first Townsville Pacific Festival Contest (I hope the first of many). I trust that all will find it as interesting and enjoyable as our contests.

It's an good luck  
Ray Kearney, VK4HE  
Queensland Contest Manager

## 1. TIME OF CONTEST

The Contest will be of 24 hours duration 0600 GMT Saturday 8-6-74 to 0600 GMT Sunday 9-6-74.

## 2. SECTIONS

- Transmitting all bands phone only.
- Transmitting all bands CW only.
- Transmitting all bands. Open.
- Receiving all bands. Open.

## 3. CONTACTS

- CW contacts count as double score (CW to CW).
- 1 contact per band only.
- No cross band contacts.

## 4. AWARDS

- A Certificate will be awarded to each entrant who submits a log.
- A Certificate will be awarded to the highest score in each section for each call area.
- The entrant with the highest overall score will

be awarded a Certificate.

- A trophy will be awarded to the entrant with the highest total score. The trophy will be held until the next contest (i.e. two years).

## SCORING

- For contact with VK4WIT 15 points to be added to score on table below.
- For contact with any other Townsville station 9 points to be added to score on table below.

N.B.—VK4WIT and other Townsville stations are the only VK4 stations that other VK4 stations can contact. Scoring for VK4WIT and other Townsville stations will be the same as for other VK4 stations. However VK4WIT and Townsville stations receive no bonus points.

## CONTACT POINTS as per table below —

	VK1	VK2	VK3	VK4	VK5	VK6	VK7	VK8	VK9	VK0
VK0	0	0	0	0	0	0	0	0	0	0
VK1	—	1	1	2	2	2	4	4	4	6
VK2	1	—	2	1	2	6	3	4	4	6
VK3	1	2	—	3	2	4	1	6	5	6
VK4	2	1	3	—	4	0	5	2	1	6
VK5	2	2	2	4	—	1	5	1	6	0
VK6	0	6	4	0	1	—	4	1	2	6
VK7	2	3	1	5	5	4	—	6	5	0
VK8	4	4	6	2	1	1	6	—	2	6
VK9	6	6	6	1	0	2	5	2	—	6

\* Queensland stations may work VK4WIT and other Townsville stations.

## Awards Column

with BRIAN AUSTIN VK5CA  
P.O. Box 74, Crafers, SA, 5152

### Townsville Pacific Festival Award 1974

A certificate will be awarded to those amateurs who work VK4WIT (Townsville Amateur Radio Club Station) on either a HF or VHF band.

The award is available only during the Pacific Festival, which is to be held 7th June 1974 to 17th June 1974 inclusive. Open to all licensed amateurs and SWLs, Australian and overseas.

Endorsements will be made for a particular band or mode where applicable.

VK4WIT will be operating for the duration of the Festival. Other Townsville stations will be operating on all bands during the period of the Festival. The Townsville Club Net operates every Sunday on 3600 kHz at 0645 GMT.

Send applications to PO Box 964, Townsville, together with a list of the stations worked.

### WAZP Award

The award is available to licensed amateurs. Contacts on and after 15th May 1962 are valid. Do not send QSL cards. A list showing full details of the contacts should be certified by the Awards Manager.

There are no band or mode restrictions. The fee for the award is five IRCs. The address for application is:

Radio Club Paraguay  
Post Box 512,  
Aunclion, Paraguay

Confirmed contacts are required with each of the nine ZP call areas.

### Heard All Continents

The award is available to shortwave listeners. QSL cards dated on and after 30th July 1952 are valid. Do not send QSL cards. A list showing full details of the stations heard should be certified by the Awards Manager.

The fee for the award is five IRCs. The address for application is:

JARL Awards Manager,  
Post Box 377,  
Tateo Central, Japan

Rules: Continental limits are those defined by the IARU.

Requirements: One QSL card is required from each of the six continents: North America, South America, Europe, Africa, Asia and Oceania.

The award is available to licensed amateurs. There are no date limitations. Only log data is required for the award and full details should be sent to the sponsor.

There is no fee for the award. It is suggested

that two or three IRCs be sent to help defray expenses. The address for application is:

QSL Manager,  
Post Box 964,  
Tateo Central, Japan.

Requirement: Contact is required with ten different QDS stations.

## Y.R.S.

with Bob Guthberlet

Methodist Manse, Kadina S.A., 5554

With the seasonal break ended, clubs will have commenced activities again, and we look forward to another year of increased activity and service to youth. Within a few weeks, definite plans will be made for the Conference to be held at Maitland, NSW during the period August 31st and September 1st, 1974.

I have to announce the resignation of Mr. Rex Black, VK2YA, as Chairman of the Standardisation Committee, as required by the last meeting of the Council. Mr. Black has rendered noteworthy assistance to the Scheme, of which he is the Founder, and his influence and service will be duly recorded. The report of the committee will be presented to the forthcoming Conference.

An interesting letter received from Mr. T. A. Grunwell, Acting Principal of the North Rocks Central School for Blind Children, makes inquiry regarding the possibility of YRCS giving assistance to blind people, enabling them, through the media of Amateur Radio to have contact with others more fortunate, and also to afford a hobby activity which could open up for them a whole new world. In answer to this appeal, the Maitland Radio Club will investigate the possibility of sending tape recordings to the school, and helping to assist these people. The day may come when YRCS will have lessons in braille for the instruction of the blind.

During the past few months new State Supervisors have been appointed, and there appears to be a serious problem over records not being available. Will all supervisors please keep records of club members, etc. etc. so that same can be handed to successors.

Details of the Novice Licence are not to hand, but we anticipate that we are meet at Maitland, we shall have definite information for discussion.

In the meantime, be enthusiastic about YRCS. Talk about it; work for it, and above all, do not lose your sense of humour!

\*Queensland stations may work VK4WIT and other Townsville stations.

## SCORING FOR VHF AND UHF

Same as for H.F. except that on bands above 50 MHz (i.e. interstate contacts are permitted) for this purpose, a contact on frequencies above 50 MHz within an entrant's own call area will score 1 contact point. With the exception of VK4 where the Bonus rule applies for contact with VK4WIT or other Townsville stations.

## CONTACTS ON 160 METRES

Same scoring as in table with additional 5 bonus points per contact.

SEND US YOUR  
Townsville Pacific Festival Contest,  
P.O. Box 964,  
TOWNSVILLE, Qld. 4810  
CLOSING DATE FOR ENTRIES  
31st July 1974.

## Key Section

with Deane Blackman VK3TX  
Box 362, Clayton, Vic., 3158

Since the last list, we welcome as new members to the section VK3JVL, VK4GX and VK4KO. I am again behind with preparation of certificates, and am having trouble finding a method of sending them which will withstand the assaults of the postal system, but you will get them.

The section will be losing the services of Russ, VK3RX, who has assisted in VK3 and made valuable suggestions in the early days of the section. Thanks for your help, Russ.

My comment about CW in the Rosa-Hull raised

a couple of letters (for which I thank the authors) but I will remark on one point only from these which seemed to me to question the motives of the Key Section in urging the use of the mode in what is undisputed phone territory. Let me say that the Key Section has no view other than trying to make the most opportunities available to those who enjoy key pounding. As I see it, that includes the continuance of a CW section in a VHF contest. The politics of the matter of course are that if nobody uses the opportunity it will go away, so some encouragement does not seem out of place.

For VK3 there is another slow mode transmission becoming available shortly through the members of the Western Suburbs Club 1900 local on 1808 kHz, and as I understand it this will be nightly during the week. A good effort.

Now, VK4SD wrote to me before Christmas suggesting that the Section might look into the H.I-Moray key being advertised in AR. Getting a satisfactory hard key is becoming a positive impediment for some in using the mode. As a result too, VK3XB has been playing with one of these and his learning has been extensive enough to warrant a separate report for the magazine. One comment for me: I don't want to anticipate it's article was that the key is pretty high, so that you cannot easily use the technique of resting your forearm on the table edge. I am not sure how many who train for the send key sit at the front of the table. I for one can remember being much disturbed by this discovery, made at the exam.

## Ionospheric Predictions

with Howard Rider, VK3ZJY May, '74

## Hamads

- Eight lines free to all W.I.A. members.
- Copy should be in block letters or typescript, signed and forwarded to The Editor P.O. Box 150 Toorak, Vic. 3142
- QTHR means that the advertiser's name and address are correct in the current Australian Callbook.

### FOR SALE

**Lafayette** Receiver H4000, 80 to 8 metres solid state, as new \$160. Ph: (02) 863 7336. VK2ZKA, QTHR.

**Receiver** indicator Unit RAAF Type R85/APN9 \$10. AR7 complete with PSU rack and manual. \$95.

**Receivers** BC405 and CCT46108, 5-8.1 Mega. \$10. 0800-0800 0800-0800

**Modulator A & R, Valve Type** AM with 3 transformers and 3 807s \$10. Will separate, or the lot for \$100. VK3YBW, QTHR. Ph: (03) 52 2681.

**Yessie FT107 Transceiver**, 160-10m, complete with MFC, manual, AC/DC plugs, excellent condition. \$425 VK3SE, Ph: (03) 55 0321

**144V6 10-40m, trap vertical antenna** with instructions. Worked DXCC. \$30. VK3BCV, QTHR. Ph: (03) 945 4775.

**Business Collection**. Ideal for CW and Phone CQ. SSTV Video CQs, Station and operator identification, Test patterns etc. A few new and sealed 30 and 180 second TDK compact cassettes available at \$3.50 each, postage paid. Hear to use on 14230/21340 SSTV. VK1AU, QTHR.

**PT 75**, with companion external VFO and AC and DC (mobile) power supplies. \$500. Write Alan VK3UW c/o Box 525, Geelong or Ph: (03) 541 2452 B.H.

**FT107**, tube and iron, as new condition. \$400. VK3TG, QTHR. Ph: (042) 125 1638.

**30' T Tower**, Fall 3 in. x 3 in. seasoned timber (undercoated). All braces, brackets, nuts and bolts. Ring Mr. Sinclair FIRST 78 0006, after 6 p.m. VK2SE, QTHR.

**Swan 55B SST** Transceiver, AC and DC, PS, excellent condition, with manual. \$330. VK3JAD, QTHR, but Post Code 2554. Ph: Lismore 138 (evenings).

**VK3 576** Mixer Converter, complete with crystal, wired and tested. \$35.

**VK3 PIR** Car Phone, IF stages, complete with crystal, wired and tested. \$45. VK3BEC, QTHR.

**FT107 800** Transceiver with noise blaster, 180 metre crystal and kit included, perfect condition, \$440. OMO. VK2BQO. GPO Box 5000, Sydney, NSW 2001.

**FREE**. Box pre-1936 tube, mainly junk but good material to restorer, plus 5 dollars, all pre-1936. You can have if you collect. VK3TX, QTHR.

**SONNET 800-900 100W PEP 800/0W XMITR** 80-10m, good cond. w/spare. 600S final tube, \$140 OMO.

**Phillips EL3642** tape recorder with accessories, good cond. \$50 OMO. You pay freight. VK4ZV, QTHR. Ph: (072) 32 2851. AH, (072) 80 2997 Ben.

**AWA** low band tx, rx, and h.d. 12V supply \$15. **LB811** 5kg generator 525. Class C Weymanette 675. 8 and 12 volt battery charger \$5. Heavy duty power transformers, chokes, quantity 150 ohm co-ax cable, valves, crystals, etc. VK3AH3, QTHR. Ph: (08) 286-2024.

**Receivers** especially built for BWLs & Am. bands 160-10 metres. 16 valves. A/C operated, \$180. **Transmitter** Receiver. 80-40-20-15 metres. AC or DC operated. 12 volt. 17 transistors and 6 Pats. \$100. **Parasitic** Adapter. 455KC I/F. Type SA-3 T/250. \$50. H. L. Roach. Ph: (03) 585 5737.

**Gulley GT108** Transceiver, 550 watts, with matching speaker cabinet, built in PSU. Excellent order and condition, complete handbook, \$425.00, had from new, or exchange for Yessie FT75, cashed off.

**Yessie FT299** with PP 200 AC power supply, \$300 OMO. Matching 100 metre transceiver, \$30. VK3AYO, QTHR. Ph: (03) 544 4109 AH.

## OBITUARY

**CHRISTOPHER BRUCE DEIN, VK2ZBK**

Died March 18th, 1974.

Amateurs were saddened to learn of the sudden passing of Chris, VK2ZBK, on March 15th at the early age of 22.

He had impressed the many amateurs on the VHF bands with his bright and friendly personality and willingness to help at all times. Chris enjoyed his hobby to the full. Only two weeks before, at the Ouseford F&D Day, he had entered most events to win one of them.

Few knew of his long standing illness that was eventually to take him from his family and friends. All associated with him were privileged — Chris was a true amateur in every way.

First licensed in 1968 whilst still at school, he was active from home and mobile on the 144 and 52 Mhz bands. Perhaps he was proud of his 525 mhz FM signal that was heard in many parts of the continent.

To his father George, his mother and family and to his fiancée Joy, amateurs extend sincere sympathy.

VK2HZ

**Audio** Oscillator, AWA R7077, \$30; Frequency Meter BC221-A1, \$30. Both good order, VK3MD 81 Cave Ave., Bridgewater 5155, Ph: (08) 339 2064.

**Offered** black hammettstone transceiver cases in calcium plated steel, 2 off. Included are 2 inch sub-cases. Size 7 inches by 14 inches by 10 1/2 inches each. VK3SDR (03) 546 3866, QTHR.

**RMS**, Converter VHF, freq. range 48.5 to 54.5, 148.5 to 149.5, 219.5 to 225.5, 988. Old Magnavox speaker box approx. 1920. Offer, VK3UW, QTHR. Ph: (02) 708 6676.

**Capitol** of QST 1970—74 price plus freight paid. VK3KE, QTHR.

### WANTED

**Information** on Wireless Net No. 38 MK2 7.4 to 8 Mhz. Also Valves for above 3 x VP23 (ARP12) and 1 x V484A (ATP). VK3YBW, QTHR. Ph: (03) 811111.

**Signal** Tracker as in March 1973, EA or similar. Ph: (02) 863 7336. VK3ZKA, QTHR.

**Circuit** of PYE PTC 8204 LW FM transceiver. VK3DV, QTHR.

**Yessie** FT 616 400 transmitter, details of any extras or mods to VK3AQO, QTHR. Ph: (032) 71 888.

**800** Transceiver (part. multi-band) for mobile use. Details to: VK3AFY, QTHR. Ph: (042) 81 4887 AH.

**Good** Collins AR7 12 with HT and Sine Supplies 60 watt CW and AM, all band CW clarity at 100 watt for 12V 2AMX or similar. VK3SA, QTHR.

**Circuit** Diagrams of TV sets, circuit diagram of Tams AM1000 Transceiver and a good accurate Signal Generator. State price and condition of all items. T. Bird, 78 Horrie St., Annerley 4105, Brisbane.

**Onsell** and/or Manual for RX YGA R5223. Please contact Cal Bryant, 18 Arnold St., Holland Park, Qld. 4121.

**Inductor** 30 mH, variable by Roller Type Wheel. Must be complete with indicating mechanism and suitable for home brew ATU. VK3OM, QTHR. Ph: (03) 546 1316.

## EMC

It is intended that September AR will be an EMC issue . . .

Any articles on Interference and EMC generally will be gratefully received

Dead line — 30th June

**Historical Section** wants old mags, papers, articles, photos, drawings—up to W.W.2—for copying or as donations. Please write VK3ZS, QTHR or WIA Executive office.

## 20 Years Ago

with Ron Fisher VK3OM

MAY 1954

It's always interesting to look back at the gear we used in the past and make a few mental comparisons. A full page advertisement by one of our large disposals dealers of the time gives an indication of what was available and presumably what the average amateur thought of as desirable around May 1954.

Try a few of these Marcon communication receivers type 1155 at £45. Bendix compass receivers type MN26 at £27. Or what about a Bendix G99 transmitter, often found in the "best" amateur shacks, at only £37/10/-? Perhaps if you couldn't quite run to a G99, a Marconi 1154 transmitter at £12/10 or an AT5 transmitter at only £9/17/6 would fill the bill. For the home brew man what better than a few TU tuning units at £2/10 or £3/10 for the TUBS which covered the 30 metre band and had variable condensers ideal for all band transmitters.

I think we are getting rather better value for our money these days. May 1954 Amateur Radio featured the following state of the art technical articles. Hans Ruckert VK2AQJ continued his series on receiver set activity problems. The double crystal filter was discussed along with a practical application of it in a typical amateur receiver.

Tom Athay continued his "Complete Amateur" with the aerial tuner and two power supplies. In typical fashion of the time a 300 volt 200 millilamp supply took up no less than a 17 inch x 16 inch chassis. After all we had to fill that six foot rack come what may.

21Mcs. On the BC345 Receiver by L. Eliason VK3ALE. The 200 to 500 kHz range was modified to give band spread tuning of the new 15 metre band. Perhaps the same technique could be used to provide continuous coverage from 16 to 30 MHz on this still popular receiver. An easily built audio frequency meter reprinted from QST shows how to achieve spot-on frequency checks in the amateur bands in conjunction with a 10 kHz crystal loaded multi-vibrator.

## technical articles for ar

- preferably typewritten manuscript, but hand-written acceptable
- double spaced, one inch margins, one side only of quarto or foolscap sheet
- spelling and grammar entirely optional; editorial staff will polish.
- drawings made by AR staff from sketches submitted.
- good, clear, glossy photos welcomed with open arms. do not forget captions.
- send it now to:—  
P.O. Box 2611W,  
Melbourne, 3001.

### WIA PUBLICATIONS

RTTY-7B Vol 1

Net Wt  
\$2 50 105g

Vol. 2 (nearly ready)

\$3.00 220g

Log Book (VK6 model \$1 00

1973 WIA Call Book \$1 20 120g

### Back Issues of A.R.

March 1972 onwards except June, July, Aug, 1972 and April 1973, all of which are out of print—

1972 issues 30c each

1973 issues 40c each

1974 issues 50c each  
each approx. 75 g

Please add sufficient postage for each order

### Magazine Subscriptions

Under revision—please refer to list on page 7, A.R. February 1974

• OTHER ITEMS—Please write for new list

W.I.A. "MAGPUBS"

P.O. Box 150, Toorak Vic., 3142

## GEELONG HAMFEST

Over weekend 11th and 12th of May 1974.

### SATURDAY

1400 hours onwards: Rag-chew, Registration, Car Phone checks, Dinner and Entertainment.

### SUNDAY

Display of Commercial equipment, Car Phone checks, Scrambles & TX Hunts on both 40 and 2 metres. Disposal sale, Appetising lunch. Entertainment for everyone.

### FURTHER DETAILS

ALAN BRADLEY  
VK3LW Secretary,  
Geelong Amateur Radio Club,  
Box 520, Geelong 3220, or  
Telephone Bob Wookey,  
Geelong (052) 21-2674.

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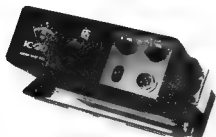
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# INOUE COMMUNICATION EQUIPMENT CORPORATION



## 'ICOM' VHF & UHF FM TRANSCEIVERS

Model:	IC-20	IC-22
<b>General</b>		
Numbers of Semi-Conductors Employed	32	33
Translators	4	5
F.E.T.	1	1
Diodes	20	20
Power Source (Negative Ground)	13.5V $\pm$ 20%	13.5V $\pm$ 20%
Current Drain	Transmit HI-10W Transmit LO-1W Receive at Peaking Receive Average	2.1A 1.2A 350mA 150mA
Antenna Input	50 ohms	50 ohms
Dimension H x W x D in mm	56x150x216	56x150x216
Net Weight	2 kgs.	2.1 kgs.
<b>Transmitter</b>		
Frequency Range MHz	50-54	144-148
Band Spacing	1 MHz	2 MHz
Channels Crystal Controlled	12	22
RF Output Power Switchable Mode (Phone by FM)	FS	FS
Mix Frequency Deviation	$\pm$ 3-15KHz	$\pm$ 3-15KHz
Modulation System	Variable Reactance Phase Modulation	2x2x2
Multiplication	—60dB or less	—60dB or less
Spurious Radiation	10 K/ohms	10 K/ohms
Microphone Dynamic P.T.T.		
<b>Receiver</b>		
Frequency Range MHz	50-54	144-148
Band Spacing	2 MHz	4 MHz
Mode (Phone by FM)	FS	FS
Receiving System	Double Super Heterodyne System	
IF 1st MHz 2nd KHz	10.7 & 455	10.7 & 455
Sensitivity	a. Better than 0.4 $\mu$ V at 20 dB quieting b. S+N/N at 1 $\mu$ V input, 30 dB or more —60dB or less	a. Better than 0.4 $\mu$ V at 20 dB quieting b. S+N/N at 1 $\mu$ V input, 30 dB or more —60dB or less
Spurious Response	—60dB or less	—60dB or less
Band Width	a. $\pm$ 8/2 $\pm$ 15KHz at —6 dB point b. $\pm$ 16/2 $\pm$ 25KHz at —60 dB point —3 dB	a. $\pm$ 8/2 $\pm$ 15KHz at —6 dB point b. $\pm$ 16/2 $\pm$ 25KHz at —60 dB point —3 dB
Squelch Sensitivity	1.5W	1.5W
Audio Output 8 ohm		

### PRICE:

**\$198 \$198**

### ACCESSORIES

Microphone, Microphone Hook, Power Cord with Plug, Spare Fuses, Mobile Mounting Apparatus, External Speaker Plug, and Silicon Cloth.

FOR OTHER MODELS SEE MARCH 'AR'

## VHF FM, PHASE LOCKED LOOP SYNTHESIZED VFO TRANSCEIVER

Model	IC-21
<b>General</b>	
Semi-Conductors Employed	54
Transistor	13
F.E.T.	2
P.U.T.	6
Diodes	53
Power Source	DC 13.5V $\pm$ 15%
Antenna Impedance	50 ohms Unbalanced
Current Drain	Transmit HI 10W Transmit LO 0.5W Receive at Peaking Receive Average
Dimension: H x W x D in mm	Approx. 2.5A Approx. 1.2A Approx. 600mA Approx. 600mA
Net Weight	111 x 230 x 260 5.4 kgs.
<b>Transmitter</b>	
Frequency Range MHz	146-148 Variable
Band Spacing	2MHz
Main Channel Selector	146.9MHz
Mode Phone by FM	FS
Channel S Power Variable	10W-0.5W
Frequency Deviation	$\pm$ 5KHz
Modulation System	Variable Reactance Phase Modulation
Multiplication	(133-137MHz $\times$ 10.7MHz) $\times$ 1
Spurious Radiation	—60 dB or better
Microphone P.T.T. Dynamic	500 ohms
<b>Receiver</b>	
Frequency Range MHz	146-148 Variable
Band Spacing	2MHz
Main Channel Selector	146.9MHz
Mode Phone by FM	FS
Receiving System	Double Super Heterodyne
Intermediate Frequencies	1st 10.7MHz 2nd 465KHz
Sensitivity	a. Better than 0.4 $\mu$ V at 20 dB quieting b. S+N/N at 0 dB input, 30 dB or more
Band Width	$\pm$ 8KHz $\pm$ 16KHz
Spurious Response	—60 dB
Squelch Sensitivity	$\pm$ 8KHz or more
RIT Coverage	Over 1.5W
Audio Output Power at 8 ohms	30KHz or its multiples
Marker Frequencies	by Integral numbers

### PRICE:

**\$356**

Also available. IC30 for 430-450MHz \$328. Details on request.  
NOTE: Available Regulated DC Power Supply Unit for AC Operation for 100 117, 200, 220 & 240V Model IC-210 and 211 have inside space for such unit  
Available Duplex Communication through Repeaters. Duplex by  $\pm$  800KHz  
Installed in IC-211



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Tel.: 69 2040.

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Tel.: 43 5305.

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Tel.: 23 4435.

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Toowong, Queensland, 4066. Tel.: 70 8097.

**W.A. Division Instruments,**  
70b Hale Road,  
Wembley Downs, W.A., 6019. Tel.: 41-4117.

# YAESU VHF CURRENT MODELS



**MODEL FT-620** six metre SSB/AM transceiver, 50-54MHz capability in 8 segments, equipped for 52-54MHz. May be operated from 234V AC or 13.5V DC. Includes built-in VFO, noise blanker, speaker and microphone.

**MODEL FTV-650** six metre transverter, 50-54MHz capability in 8 segments, equipped for 50-54MHz. Designed as an auxiliary unit with a Yaesu transceiver or transmitter/receiver combination on tunable ranges covering 28-30MHz. Power is derived from driving unit.

**MODEL FT-2FB** two metre FM, fixed channel transceiver, 12 channels capability, equipped for three channels, installed ready to operate. Operates from 12V DC in mobile service. Matching AC power supply Model FP-2 is also available for base use. Microphone included.

**MODEL FT-220** two metre, SSB/FM/CW transceiver, 144-146MHz in 4 segments. May be operated from 234V AC or 13.5V DC. Includes built-in VFO, noise blanker, calibrator, speaker, microphone and fixed channel facility.  
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**NEW MODEL 200R** two metre FM, 200 channel frequency synthesised transceiver.  
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# SIDEBAND ELECTRONICS ENGINEERING

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Prices quoted are with by-law import duties exemption. Firm order must be accompanied by minimum 50% deposit, 3 photo-copies of the amateur station license for the by-law application. Average delay in delivery 6 to 8 weeks.

FT 101 B AC/DC 180 to 10 M and fan	\$525
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FT/FP 200, but in very short supply	\$370
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**TH 3 JR** 10/15/20 M junior 3 el. Yagi, 12' boom 20 lbs weight \$100

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**TH6DXX** 10/15/20 M senior 6 el. Yagi 24' boom 60 lbs weight, 1KW \$175

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New surplus 8 core control cable, \$0.25 per yard.

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